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Railway Age

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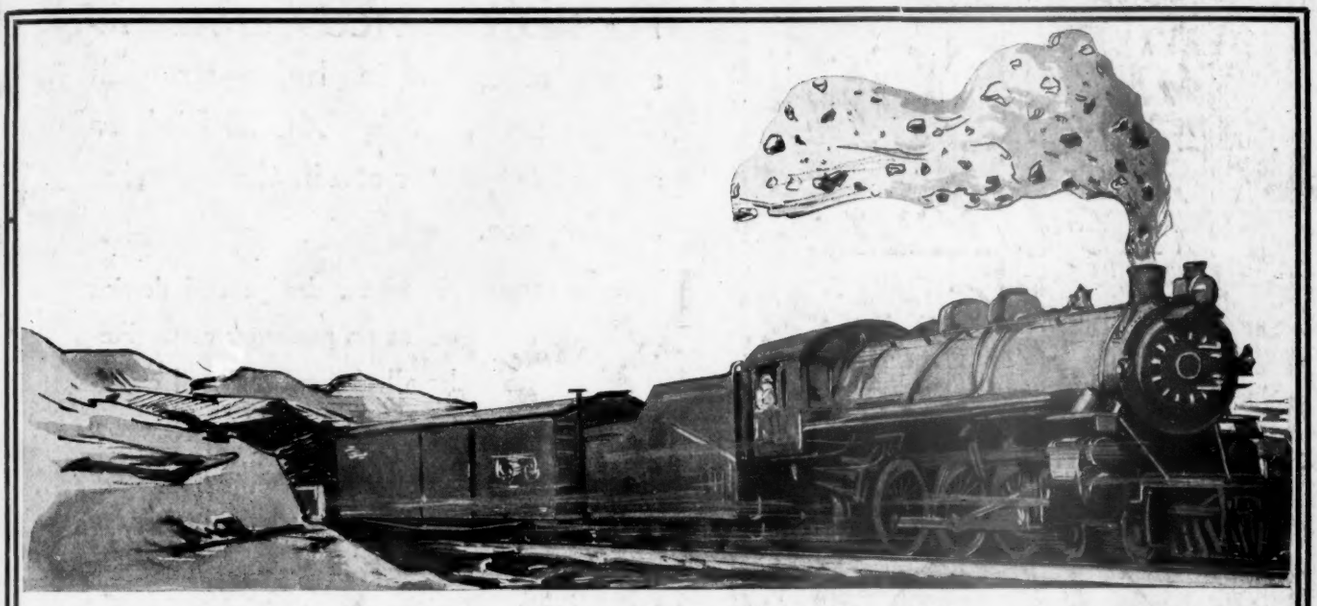

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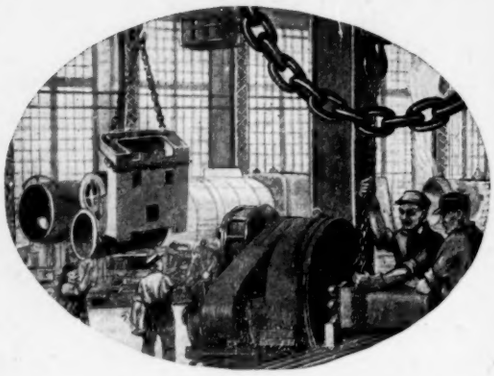

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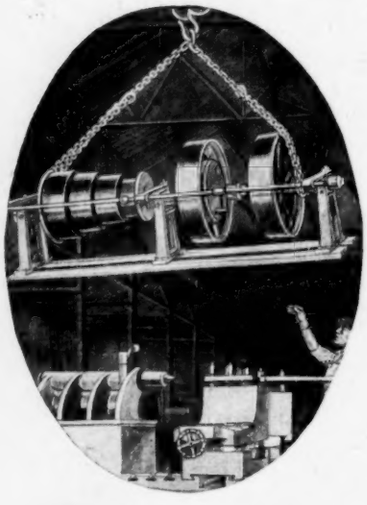

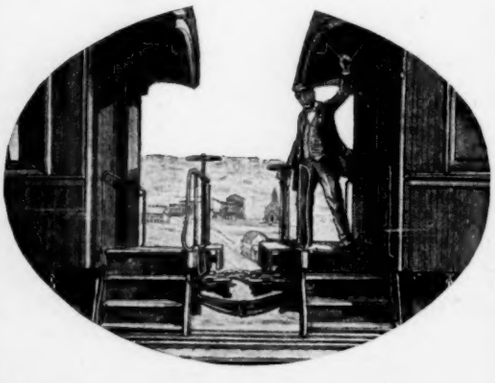

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EDITORIAL
Railway Age

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A Remarkable Record of Increased Efficiency

WHILE THE ADVOCATES of government operation are finding fault with the management of the railways under private operation, the railways are going ahead making records of increased efficiency that are vindicating the wisdom of the public in having them returned to private operation.

Statistics already made public regarding the number of carloads of freight moved in August have shown that in that month more freight was handled than in any previous August in history. Statistics more recently compiled by the Interstate Commerce Commission disclose the fact, which even those in close touch with traffic conditions did not know, that even in July, when the effects of the switchmen's strike were still felt, the railways handled more business than in July of any preceding year. The number of tons moved one mile in July, these statistics of the Commission disclose, was 40,232,000,000 as compared with 39,347,000,000 in July, 1918, the record up to this time. One of the important reasons for the increase in the traffic handled, which the statistics of the Commission disclose, is that the average number of tons loaded per car in July showed a large increase, being 29.6 tons, as compared with 27.8 tons in July, 1919.

The commission's statistics also disclose the fact that in spite of the "outlaw" railroad strikes the total amount of freight handled by the railways in the first seven months of 1920 was greater than in the same period of any preceding year, being 249,000,000,000 tons carried one mile, as compared with 247,500,000,000 ton miles in 1918 and 213,000,000,000 ton miles in 1919.

With the facts now before us, it is safe to predict that the total amount of freight handled in the entire year 1920 will be greater than in any earlier year in history. The number of cars loaded week by week still continue to show increases over the corresponding weeks of previous years. In the week ending October 2, the latest for which a report has been made, the number of cars loaded by the Class 1 roads was 975,946, as compared with 957,596 in 1919 and 971,895 in 1918. In the week ending October 9, as the statistics of the United States Geological Survey show, the number of tons of bituminous coal transported was 12,075,000, which sets a new record for this year and closely approaches the highest record ever made in any past year. Since the statistics of the Interstate Commerce Commission show that even back in July the railways moved more freight than ever before in that month, it may be predicted with the utmost confidence that when complete data are available they will show that all previous records have been broken in every subsequent month.

The Interstate Commerce Commission's statistics for July throw a new light upon the increases in operating efficiency which have been secured since the railways were returned to private management. Reference already has been made to the large increase which has been made in the average number of tons loaded per car. This has been largely due to the energetic co-operation which the shippers of the country have been giving to the railways. In addition, the average miles that each freight car was moved daily was 26.2, as against 24.1 in 1919. The number of serviceable cars had been increased to 92.8 of the total, as compared with 91.2 in the same month of last year, and the average number of tons per train was 769, as compared with 761.

One of the most important results the railways have obtained is the practical elimination of all congestions in their terminals. When they were returned to private operation on March 1, the number of loaded cars accumulated in the terminals awaiting movement was almost 100,000. In the week ending October 8 this had been reduced to 41,135, of which nearly 18,000 were being held at the ports for ships in the transoceanic and coastwise service. The accumulations of cars are now so small that it may be said without exaggeration that congestions have ceased to exist.

With this record of increased efficiency already established, the railways do not need to fear captious criticisms of persons who, regardless of facts, apparently are still determined to try to show the superior efficiency and desirability of government operation. As long, however, as a large shortage of cars is still reported, and vast amounts of freight, especially coal and grain, are still waiting to be moved, the most energetic efforts should still be put forth to increase efficiency. The increases in efficiency which are being obtained not only make practicable the movement of the country's business, but also help to keep down expenses, and if, under the new passenger and freight rates, the railways are to earn adequate returns the utmost economy of operation consistent with adequate maintenance of the properties must be secured.

Tell the Men About It

There has probably never been a time in the history of American railroading when the rank and file of the employees have been so keenly alive to the necessity for the conservation of cars as the present. The message has been brought to them verbally by the local supervisory officers, by posters and printed appeals, through the employees' magazine and in various other ways. The history of most campaigns of this character is that interest is allowed to lag as soon as the emergency passes. This should not be permitted to occur in the campaign now under way, for even when the time comes that the roads are able to provide a sufficient number of cars to meet the needs of traffic, the economies resulting from the loading of cars to capacity and of keeping them moving will be sufficient to warrant and demand a continuance of these efforts. The present campaign can be sustained indefinitely only by maintaining the interest of the employees in these measures. This can be done in no more effective manner than by the managements taking the employees into their confidence, telling them of the results secured and thus creating in them an interest in the success of their roads. By thus showing them at frequent intervals that their efforts are bringing results, they will be stimulated

to greater and more prolonged efforts. Railway officers can well afford to give this subject serious consideration at the present time in order that they may not lose the results of the drive which they are now conducting but may continue them permanently.

The Tenth Fuel Commandment: Stabilization

Unquestionably the most important problem relating to fuel with which the railroads must deal today is that of stabilizing fuel supply. The control by every railroad of at least 40 per cent of its fuel supply is vital; it may be effected by lease or the purchase of mining properties. Many railroads have long appreciated this fact, but there are many who annually switch from one character of coal to another, and in time of stress must cling to the sweepings of the most insignificant of wagon mines and endure the agony of engine failures that follow in their wake. As the man who failed to shingle his house in fair weather, because it was not necessary, and could not shingle it in stormy weather, so there are railroads that have failed to stabilize their supply in the days when many mines were selling excellent locomotive coal for less than one dollar per ton. The purchase of railway fuel coal in a dull market at less than cost is just as unfair to the mining industry as the exorbitant fuel prices are unjust to the railroads. If locomotive fuel is uniformly good, the fuel problem is simple. If locomotive fuel is uniformly bad, the problem is difficult. But when the quality of locomotive fuel changes with every new purchase necessitating the redrafting of locomotives and a change in firing methods, the problem is impossible. Prior commandments have dealt with the purpose, the scope and the conduct of an organization to promote fuel economy on the railroads, the tenth fuel commandment outlines the only broad policy wherein the management of every railroad can fully co-operate with fuel conservation and wholly safeguard the best interests of its property.

Advantage of a Comprehensive Bridge Program

A very large part of the railroad bridges in this country still fall under the classification of temporary structures of which a more or less definite percentage must be renewed each year. Many of them are replaced in kind, but under a policy that looks toward their ultimate elimination, a portion of these temporary bridges are replaced by some form of permanent construction. Under the usual practice the preparation and approval of the budgets covering such projects are governed by the general policy of the management as outlined from time to time and as influenced by changing financial conditions, but each year's work is largely a law unto itself. One road, however, has found it to advantage to anticipate the capital requirements to this end for several years in advance by adopting a tentative program for the elimination of virtually all the remaining temporary structures on its main lines within a fixed period of time. This plan is not absolute but represents a "mark to shoot at," which may, however, be subjected to adjustment as subsequent circumstances direct. The object of this outline is to equalize capital requirements, obtain a better balance in the demands on the construction forces from year to year and to secure greater economy in the maintenance of the old structures. Under this arrangement, the bridge engineer's plan provides for the replacement of approximately an equal length of trestle construction on each division each year. The various structures are then slated for renewal at dates which meet this plan as far as possible. Of course, questions of future change of grade or other uncertainties make it necessary to leave certain structures out of this program. It should also be understood that the tentative adoption of this plan does not relieve or deny the management of its prerogatives in passing on each annual bridge budget in detail. Nevertheless, the plan permits of a more expeditious supervision of the bridge renewals than is usually possible.

The Heat Treatment of Springs

It is generally conceded that spring making in the majority of railroad shops is carelessly handled; and this in spite of the fact that a few shop managements, having secured extremely desirable results with modern machinery and equipment, are perfectly willing that others should study and duplicate their practices. The difference between strong and weak springs is largely a question of heat treatment; in one instance the adoption of proper heat treating equipment, including pyrometers, in a certain shop, made possible an increase of 50 per cent in the life of the springs. The importance of this subject and the possibilities of saving can be appreciated when it is considered that the output of one spring shop for a single division of one railroad is 400 elliptic springs per month. These springs are used under all classes of equipment and include truck springs, driver springs and trailer springs for locomotives; also truck springs for tenders, coaches, cabooses, etc. Quantity of spring shop output must not be secured at the expense of quality. If a locomotive or car, after undergoing general repairs, is found to have a defective spring it must be replaced and the total loss in delayed equipment is out of all proportion to the value of the spring. Reliable springs, able to stand up under severe duty, must be secured. The part of the work most often carelessly performed is drawing the temper, although overheating, or uneven heating and cooling when hardening, is not uncommon and will produce serious results. Experience in making springs has shown the importance of proper heat treatment and the necessity for adequate equipment including furnaces, water-cooled oil tanks, sodium nitrate or other baths, and pyrometers. The best results can be secured only with an accurate knowledge of conditions and temperatures, and it is time that guesswork methods were discarded.

Can Engineering Positions Be Made More Permanent?

One objection often raised to railway employment, particularly for the engineer, is its lack of permanence. It is true that the insecurity of engineering positions with the railroads has not been a serious stumbling block in the recruiting of the technical graduates fresh from school, but it has served to turn many thoroughly seasoned railway engineers into other channels of opportunity. One or two bitter experiences with unemployment after periods of untiring, faithful service are enough to chill the ardor and love of almost any man for his chosen field. This problem is closely related to that of compensation, and the successful solution of the former will do much to reduce the difficulty of the latter. Railway engineers have suffered more than members of other departments because their work is largely related to capital expenditures which are increased or diminished as financial considerations dictate. Except in the case of the line officers of the maintenance of way or the mechanical departments, the work of the engineer is not such as to make him an indispensable cog in the transportation machine. Consequently, his services have been often dispensed with at the first signal for retrenchment. Much of engineering work is of a transitory nature, but there is opportunity for bettering the lot of the engineer by providing for the useful employment of larger proportions of the corps during the slack periods.

One lesson is to be found in the fact that some railroads have been able to pursue a fairly consistent policy with respect to improvements, thereby obtaining many advantages not to accrue in the case of erratic spasmodic programs, under which employment is especially uncertain. Another suggestion is the more complete preparation of engineering plans in advance of actual construction. Too much work has been done with a rush by new corps hired at the eleventh hour. Greater attention to the human element in laying the plans for projects should usually enhance the attractiveness of the work without detracting from its economies.

On Swapping Officials in Midstream

When things are not going right, when one department appears to be falling down, the first impulse on the part of some executives is to make a change, to get someone on the job who it is thought can straighten things out. In only one case out of ten is it safe to say that the fault lies in the personality or incapacity of the official whom it is decided to replace. More often the new official is no better equipped for the job than his predecessor, and he is usually handicapped by lack of familiarity with local conditions. But even if he makes good, there is the example of an outsider replacing the man who has come up in the organization to act as a damper on the aspirations of every man on the lower rungs of this particular official ladder. More than likely it was some fundamental condition that caused the trouble in the first place; possibly the management did not stop really to analyze the situation when it made the change. There ought to be someone on every railroad whose business it is to ascertain the real cause whenever the railroad appears to be faced with the necessity for dropping or demoting a man who must once have been regarded with favor and doubtless made good for a time in the position from which it is thought necessary to remove him. Men of any promise whatsoever are too scarce these days to be cast by the roadside; it might, for instance, be considerably cheaper to invest in some new shop facilities every ten years than swap master mechanics every ten months.

The Loaded Car Is the Revenue Producer

Since the revenue which a railway derives from the transportation of freight is based upon the weight of the shipments, while the cost of handling it is measured largely in car miles, it has long been recognized that a heavy car loading contributes to large net earnings. A railway, therefore, has every incentive to encourage the maximum loading of cars. Under present conditions, when there are not enough cars to meet the traffic demands of the country, the shipper likewise has an incentive to load cars heavily, for it is only by such means that he can secure sufficient equipment to transport his products. The attainment of the goal of an average loading of 30 tons per car, set by the railway executives recently, will therefore result to the benefit of the railways and their patrons alike. For this reason we urge that employees of both contribute their ideas on the means by which this goal may best be reached by preparing discussions for the contest on Means of Increasing the Average Loading of Cars which was announced in our issue of October 8. To stimulate interest in this contest, prizes of $50 and $35 are offered for the two best papers received, and we will pay our regular space rates for others accepted and published. Papers should preferably not exceed 1,200 words in length and should be confined to practical measures within the ability of the railways and the shippers to put into effect at the present time. To be included in the contest, all papers should be sent to the editor of the *Railway Age*, 608 South Dearborn St., Chicago, and must be mailed before November 10.

Moving Cars Is the Railway's Business

A division superintendent on an important Eastern railway recently asked one of his trainmasters to concentrate his attention on the elimination of delays to cars. After a few days the trainmaster stated that in carrying out this assignment he found that it required him to give attention to all of the problems which had previously come under his supervision. In other words, in investigating delays to cars in a terminal, it was necessary for him to ascertain the defects in the operation of that yard. The same was true of other investigations. His discovery still remains to be made by some operating officers—namely, that the business of a railway is to *move* cars and that in doing this most efficiently other operating problems will be solved at the same time. When *all* railway men learn that a yard is designed as a means for forwarding cars rather than as a place to store them, and that other facilities of a railway are for the same purpose, the goal of maximum car mileage will be in sight.

New Books

Exporter's Gazetteer of Foreign Markets. Compiled and edited by Lloyd R. Morris, research editor of the American Exporter. 808 *pages; 6 in. by 9 in. Bound in cloth.*

This is a ready reference guide to the imports and exports industries, shipping, banking, products, climatic and other local conditions of every foreign market. The countries of the world have been grouped in alphabetical order by continents and other major geographical divisions so that adjoining markets are found together. Under each country will be found detailed information as to area and population, commerce, production and industry, railroads, telegraphs and telephones, money, weights, measures, commercial language, local advertising media, principal shipping routes, customs tariffs, consular regulations and consular representatives, cable rates, mail time, postal rates, and regulations respecting parcel post, money orders and reply coupons. The section under each country dealing with commerce contains tables showing the value of the total foreign trade for a series of years, and the value of imports and exports by commodities and countries.

Commodity Classification. Compiled by the Railway Accounting Officers' Association. Secretary, E. R. Woodson, Woodward building, Washington, D. C.

This is the second edition of this book, the first edition having been published early in 1920 at the time that the Interstate Commerce Commission made its new classification of commodities and increased the number of classes to 70. The Railway Accounting Officers Association referred the work of preparing a list of commodities and separating them into the 70 classes prescribed by the commission to a sub-committee of the association's committee on freight accounts. It has now been found desirable to revise the commodity classification as published at the beginning of the year, and this revision has been made in the most thorough and comprehensive manner possible. It is intended to be final, unless the commission again changes its prescribed classification. The Commodity Classification is used by accounting officers, clerks in accounting departments, waybill clerks, agents and others who prepare waybills or compile data on which freight traffic statistics are based and is a necessary work of reference in understanding the figures underlying them.

Letters to the Editor

Crosstown Movements Within Terminals

San Francisco, Cal.

To the Editor:

Soon after the organization of the San Francisco Committee on Car Service, it started an investigation to determine the necessity, if any, of restricting the use of railroad equipment in dray and crosstown service. It found that the practice had grown to an alarming extent, advantage being taken of carriers' terminal and switching tariffs by scrap iron dealers and others interested only in buying and selling at a profit based on cheap railroad transportation as compared to movement by trucks and drays, the average number of cars amounting to some twenty to thirty per day in the San Francisco and Oakland terminals alone. The average delay to cars used in this service amounted to about five days and the average length of haul was less than five miles.

This abuse of equipment represents a serious economic loss to the public in withdrawing from line haul a large number of cars, reducing the average miles per car per day, congesting the terminals and requiring the service and time of switch engines and yard and clerical forces, no doubt in many cases at an actual loss to the carriers.

In view of this condition, this committee on June 20 caused to be published in the daily papers of San Francisco and Oakland, and through the Chamber of Commerce of the two cities, notice to the public that beginning on July 1 a positive embargo would be laid against the use of railroad equipment in crosstown and trap car service and no cars would be furnished except on permit from the committee. An open meeting was held in the Chamber of Commerce rooms in Oakland, prior to its adoption, at which the object of the permit system was explained to some 50 traffic representatives of industries and railroad agents and representatives. The cheerfulness with which this committee's efforts to conserve cars has been met by the public has been a source of great satisfaction to this committee.

The use of the permit system by this committee has proven to its entire satisfaction that there has been an enormous economic loss to the public as well as the carriers in the past by reason of the abuses under the terminal tariffs, the correction of which will not only save to the shipping public a great number of cars for movement of highly important commodities, but also enable the carriers to increase the supply of cars by increasing the average miles per day per car, a result so much desired at this time.

In view of the facts thus far developed and mindful of the carrier's obligation to furnish adequate transportation at all times, it is the feeling of the committee that a nation-wide attempt be made to render a great service to the shiping public by modification of tariffs to restrict the use of railroad equipment to absolute necessities in order to assist as much as possible in the movement to obtain more and better use of equipment.

In accordance with this idea, the following resolution was unanimously adopted at the regular meeting of the San Francisco Committee on Car Service on August 27, at which all members were present:

"Whereas, the urgent necessity for increased rail transportation to meet the requirements of the shipping public has become so great, and the obligation of the carriers to furnish such service so insistent, that this committee deems it a duty not only to the public but to the carriers as well to make the following recommendations:

"*First*—That the use of railroad equipment in crosstown and trap car service within the limits of the terminals served by this and numerous similar committees throughout the country, has become a serious economic loss, and

"*Second*—The elimination of such service in this and other terminals by the adoption of a permit system in effect for the past sixty days has conclusively shown how great the abuses have grown to be under present terminal tariffs, and

"*Third*—In order to meet the demands of the public for increased transportation there is absolute necessity to increase the average miles per car per day.

"*Therefore:* Be it resolved—that it is the recommendation of this committee that the carrier lines within its jurisdiction and the American Railroad Association be urged to arrange at once for a modification of terminal and switching tariffs to restrict the use of railroad equipment to movements in connection with line haul only, except that cars may be furnished for the handling of oils, acids and other liquids in tank cars, and for such other specified commodities too heavy or bulky to handle by trucks and drays, and that carriers withdraw permanently from competition with trucks and drays in crosstown movements within terminals.

"K. M. Nicoles,
"Chairman, San Francisco Committee on Car Service."

Unit Containers for Freight Shipments

New York.

To the Editor:

Referring to the interesting article on "The Container System of Freight Transportation" appearing on page 515 in your September 24, 1920, issue.

There is another important advantage of the proposed method of loading freight, which may be of interest to the technical men who are engaged in designing these unit containers, and to the operating men who are in favor of promoting their use.

Shortly after the Bureau of Explosives was organized experiments were conducted at Altoona, Pa., in co-operation with the Pennsylvania Railroad, for the purpose of ascertaining what stresses are liable to be created by the shifting of freight in an ordinary freight car subjected to coupling shocks. The information was needed in order to prepare reasonable rules governing the loading and bracing in these cars of explosive packages. It was necessary to devise and construct special apparatus to measure these stresses. Engineers interested in the subject can obtain detailed information by consulting an article "The Measurement of Impact Stresses" published in the proceedings of the American Society for Testing Materials, Volume 9, 1909.

It was found that when a freight car moving at a speed of five miles an hour collides with a string of cars, causing it to be brought to a sudden stop, there is a strong tendency for all freight in the car to be moved along the floor, and if this movement is prevented, stresses are produced which tend to rupture packages. A stress equivalent to five times the weight of the package is probably considerably less than the maximum to be anticipated where coupling shocks occur which the average railroad man will not admit to reflect rough treatment of the freight car. If the floor of the car is completely covered by packages of freight, the package at the end receiving the impact will be compressed by a force not less than five times the total weight of the column of packages. This force will be reduced in proportion to any reduction that can be made in the length of the column. The suggested use of five-unit containers will result in the

reduction of this destruction force to one-fifth of the force that would be exerted under the same conditions in an ordinary car.

It is reported that the railroads of the United States are now paying more than one hundred million dollars per annum on account of loss and damage to freight. A large part of this loss is undoubtedly due to the effect on packages of these destructive forces produced by rough handling of cars. It is important to do all that can be done to induce greater care in the handling of cars, but at the same time it would be of great benefit in this particular problem to have the freight loaded in unit containers as suggested in the article referred to.

B. W. DUNN,
Chief Inspector, Bureau of Explosives.

The Uniflow Engine

SYRACUSE, N. Y.

TO THE EDITOR:

We have read with great interest the letter in your issue of August 27, signed by J. Snowden Bell, and agree with what Mr. Bell says in his last paragraph with one exception. Mr. Bell terms the central exhaust engine the "Stumpf" engine, but the fact that a number of inventors before Stumpf have tried the central exhaust engine without success, and that the Stumpf engine is successful, should prove that there is a cardinal difference between them. The reason for the success of the Stumpf engine is that Stumpf was the first man properly to understand the requirements of efficient handling of steam in a single cylinder engine, of which the central exhaust feature is only one part.

The main loss in a single cylinder engine using a high ratio of expansion is, and has always been, initial condensation, and the central exhaust alone is unable to avoid initial condensation, as has been proved by the attempts of the early inventors. The only way to eliminate initial condensation is to admit the steam into a space of equal or higher temperature than the live steam, and the means to accomplish this is the compression combined with jacketing of the cylinder ends. This simple addition produces an immense difference in the final compression temperature, so much so that in an engine running on saturated steam with 27 in. vacuum the final compression temperature may be from 200 to 300 deg. F. higher than the live steam temperature, as has been shown by tests. A central exhaust engine without head jackets could never reach a compression temperature in excess of the live steam temperature. The combination of the central exhaust with the head jackets was the means by which Stumpf accomplished his results, and which are the reason for the success of the Stumpf engine.

As Stumpf says in the specification of his U. S. Patent No. 1,047,168—"The object of the present invention is to improve the thermal working conditions in such engines so as to enable a high ratio of expansion to be carried out with maximum efficiency in a single cylinder. This result is obtained primarily by the provision of means for heating the steam near the inlet end during expansion and compression, and secondly by using in conjunction therewith means for bringing the working steam at the end of expansion into layers of decreasing dryness towards the exhaust while the piston uncovers the exhaust ports to let this wettest steam pass off and then on the reversal of its motion covers the exhaust ports and retains them covered while the cylinder heated, drier steam is trapped and compressed up to the inlet end. By proceeding in this way the thermal temperature conditions of the cylinder are such that a high ratio of expansion may be carried out in a single cylinder without incurring the well known losses which in the past have forced engineers to have recourse to multiple expansion engines."

STUMPF UNA-FLOW ENGINE COMPANY, INC.

Statistics to Eliminate Waste

CHICAGO.

TO THE EDITOR:

The prevalent statistical program in vogue on most of the railroads may be characterized as the "Hill School of Statistics," being the outgrowth of the lines of thought and statistical programs developed on the Hill lines, the predominating characteristics of which is a tonnage measure of all accomplishments. This program has led to a tremendous development and splendid results in the increase of utility of practically all railway facilities *when used,* but this line of statistics does not make any comparison between the production and the unit of equipment employed, at least so far as the general application has reached.

By this, I mean that while we have a good increase in "tons per train," in "tons one mile per mile of road," in "tons per car mile" and "tons per locomotive mile," we have not made conspicuous the ton miles produced *per locomotive per year,* or *per car per year,* by which to observe the comparative utility of the units of equipment employed. Neither do we produce by this method any data indicating the waste in the use of equipment. In this connection, I make reference to the fact that the locomotives in freight service throughout the United States have averaged less than 70 miles per day. At an average of 10 miles per hour, this means that the engines are in motion 7 hours and are standing still 17 hours per day. The time standing still may not be all waste, as a certain amount may be necessary for repairs and care, but included in this 17 hours is a large proportion of idle time during which the locomotive is neither being repaired nor cleaned, and such time represents unutilized or potential value. These figures as to the utility of locomotives have reference to the miles per day per serviceable locomotive, and do not include locomotives out of service for necessary reasons.

Taking the same thought as to the utility of a freight car; a freight car is actually in motion about 2½ hours per day, and standing still 21½ hours. The time standing still represents that consumed in loading, unloading, being repaired, handled empty, and certain other necessary factors, but, included in this 21½ hours, there is a large proportion of unutilized or potential carrying capacity which may be properly characterized as *waste.*

Following this line of reasoning, the way appears to be open for the compilation of statistics in such a manner that a critical analysis of them will reveal that data which is related to *waste.* Admitting that the statistics compiled according to the "Hill" method reveal correct results as to the activities which result in productive units, it appears that the natural line of progress which presents the largest possibility is in the direction of the development of that information which will lead to the elimination of waste, rather than to attempt to increase the "load per car" or the "load per train" or the size of productive units (except, of course, to always endeavor to maintain the maximum load and increase the small units to that standard), but merely to increase the number of the productive units resulting from the use of each unit of equipment.

To illustrate: Assuming that a locomotive is in motion 7 hours and there is probably 7 hours of waste, outside of necessary activities, if by studying the conditions surrounding the 7 hours of waste they may be turned into 7 hours of use, the productive units resulting from that unit of equipment might be doubled. The same applies to the freight car with equal force and probably larger opportunities.

The development of a higher utility of locomotives lies entirely within the scope of the activities of the railway officers who are charged with manipulating equipment of this class.

The development of a higher utility of freight cars opens

the way for the exercise of all of the ability of the railway executives charged with the duty of manipulating the freight cars, and also opens the way for co-operation on the part of the shipping public who are probably responsible for the larger portion of the actual waste (as already indicated herein) in the use of freight-car equipment through their failure to co-operate with railway officers in the matter of ordering, loading and unloading cars.

Probably the largest single factor tending to waste in the use of freight cars is the inattention which is given to the movement of empty freight equipment.

The entire line of supervision growing out of the impetus given by the "Hill" school of statistics to operating officers concentrates their attention upon the movement of loaded cars. Any failure in the manipulation of empty cars (particularly in the matter of idle empties) is not reflected through this school of statistics, and naturally not being reflected, does not attract the attention and the effort of the operating officers. This particular field when properly developed will unquestionably yield remarkable results.

C. F. BALCH.

It Is Up to the Yard Master

NEW YORK.

TO THE EDITOR:

After all that has been written and said about speeding up the movement of cars, it is surprising to see how little has been accomplished in some terminals, due to the indifference of the general yardmasters and terminals superintendents in charge who are dying of dry rot. The reason for this inefficiency is the lack of interest and the following of systems that have been in use for 20 years or more and the failure to make the necessary changes to speed up the movement of cars through our terminals.

I have in mind a large railroad where for years a hump yard has been operated 8 hours out of each 24 hr. period. The hump crews are seldom if ever able to clean up and leave from 200 to 400 cars to be switched, which of course are not handled for 24 hours later. Cars that are humped and classified and are ready for delivery to connections or to industries are seldom delivered until some time the following day, and cars that should be in the industries ready for unloading at 7 a. m. the morning following the day they are put over the hump finally find their way in to the industry tracks from 24 to 48 hours after they have been classified. In this yard practically every loaded car is delayed from 48 to 72 hours getting over the hump and out of the classification yard. The reason for not operating a two-shift crew on the hump is the old plea of economy. Another engine and a few men would earn this company thousands of dollars each month, instead of which they are losing not only the revenue from the cars standing still but are also losing enough per diem each day to more than pay for the additional power and crews.

This delay and misuse of equipment, which is almost criminal in a time like this when every railroad officer is putting forth every effort to expedite the movement of cars, is brought about by a general yardmaster who is indifferent and a trainmaster and a superintendent who have allowed themselves to become hardened to conditions of this kind, who are justifying the delays by various alibi, and have taken unto themselves that self-satisfied feeling that "my division is the best on the railroad and I should be congratulated for doing as well as I am."

What we need now more than ever before is general yardmasters, terminal trainmasters and superintendents who are alive to the importance of the quicker movement of cars. If we speed up our terminals the balance of the railroad will speed up automatically. I don't think we are in a position to ask the shippers to hurry the loading and unloading of cars when we are using from four to six days in getting cars under load placed at industrial tracks to be unloaded.

INSPECTOR OF TERMINALS.

Investments in South American Railways

NEW YORK.

TO THE EDITOR:

The article in your issue of October 1 referring to the railroads of Colombia touches very briefly on a matter which should be of real interest to Americans interested in foreign developments.

Colombia in many respects offers one of the most attractive fields to American railway men and investors of any of the South American countries. It is comparatively entirely undeveloped from a transportation standpoint; it is rich in natural resources; it has a fairly good supply of labor, and the financial standing of its government is good. Colombia is near us and very convenient of access by frequent sailings of comfortable steamers.

There are, however, several difficulties in the way of our active participation in these developments, all of which could undoubtedly be overcome if we really desired it.

First, there is the general apathy of the American investing public toward foreign securities of any kind. This, however, is being overcome, as is shown by the oversubscription of the recent Swiss, French and Norwegian loans. These loans, however, have only been sold because these countries, have been willing to meet the price which has to be paid for money in the American market.

The transportation development of Colombia must be financed by an issue of Colombian government securities, in such form as will be acceptable to the American investing public. It is improbable that capital will be available dependent for its return on the profits of the enterprise.

Heretofore Colombia in common with most of the other South American countries has been slow in realizing the extent of the change brought about by the war from the investment conditions required in Europe in the pre-war period.

A country like Colombia which also needs so much development must concentrate on those things most needed. At present there is a dozen or more widely scattered projects, all having some merit, asking for capital.

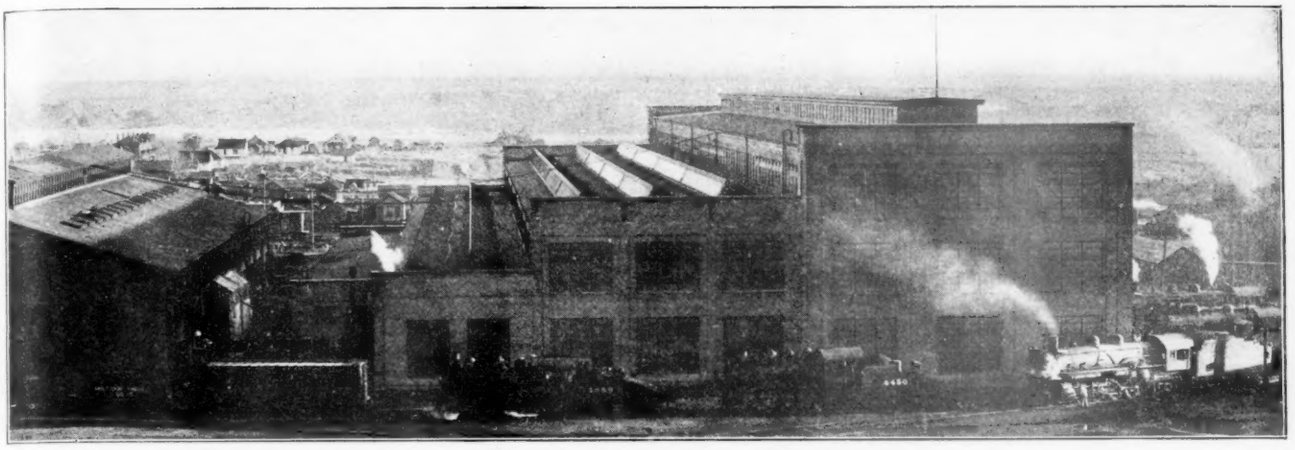
Perhaps it is asking too much of a democracy to lay out a comprehensive plan and concentrate only on its fulfillment, but if this could be done, if the plan were formulated by engineers and traffic men of known ability, and a policy announced whereby the government would agree to concentrate its resources on this only, much would be accomplished.

There is a further point which I regard as most important, and that is, the flotation of a substantial part of any loan for these or similar purposes, in the country of origin. It would strengthen our offerings here immensely if it could be stated that say 25 per cent had been underwritten by the prominent banks in the country asking for the loan.

These countries of South and Central America must inevitably look to the United States for most of their financing because, strive as they may, in order to protect their trade interests, Great Britain and the other European countries cannot begin to supply the demand. South Americans, therefore, must realize that they must meet the demands of this market if they are to get money, and that the requirements are vastly different from those of pre-war days in Europe.

By the way, Manizales is the capital of the Department of Caldas, and is not in Antioquia, as was inadvertently stated in your article.

F. LAVIS.



The New Shop Building Lies Just West of the Old One

Large Shop Marks Development of Western Road

New Locomotive Facilities at Cheyenne Exemplify the Rapid Growth of the Union Pacific

ONE OF THE MOST distinctive projects of the Union Pacific's general program to increase its motive power facilities is the locomotive repair shop recently completed at Cheyenne, Wyoming. It comprises an entirely new layout, and its magnitude represents one of the best measures of the westward progress of intensive railroad development in America. In proportions and arrangement the building is not unlike a number of other plants completed during the past year or two, but it embodies a number of features that warrant detailed consideration.

The plant is of the transverse type following what has become a more or less standard arrangement with parallel bays for the erecting, heavy machinery and light machinery departments respectively, the proportions of each bay being varied to suit the requirements. The main building has ground dimensions of 194 ft. 10½ in. by 409 ft. 8 in., being only 4 ft. narrower and 12 ft. shorter than the shop of the Pennsylvania Railroad at Logansport, Ind., which has a very similar layout. The erecting bay is 82 ft. wide center to center of columns and 56 ft. 8 in. high from floor to underclearance of roof trusses. In the same terms, the heavy machinery bay is 70 ft. wide and 36 ft. 8 in. high and the light machinery bay 40 ft. 7 in. wide by 20 ft. high.

The bay heights were determined very largely by the crane requirements. The heavy machinery bay is equipped with a crane runway for two 20-ton cranes with top of rail 28 ft. 6 in. above the floor. The erecting bay is similarly equipped and in addition has a 250-ton crane on a runway 44 ft. 6 in. above the floor. This large crane has two trolleys of 135 tons capacity, each of which is equipped with two 70-ton hooks. All five are Whiting cranes.

The Heavy Machinery Bay with Machine Tools Partly Installed

As an auxiliary to the main structure there is a lean-to 209 ft. long by 30 ft. wide placed symmetrically against the outer wall of the light machinery bay. This contains an office, locker and lavatory room, a toilet room and a fan heater room. The wash and locker room contains 158 individual white enameled iron wash basins, each equipped with hot and cold water taps, and 400 steel lockers. The

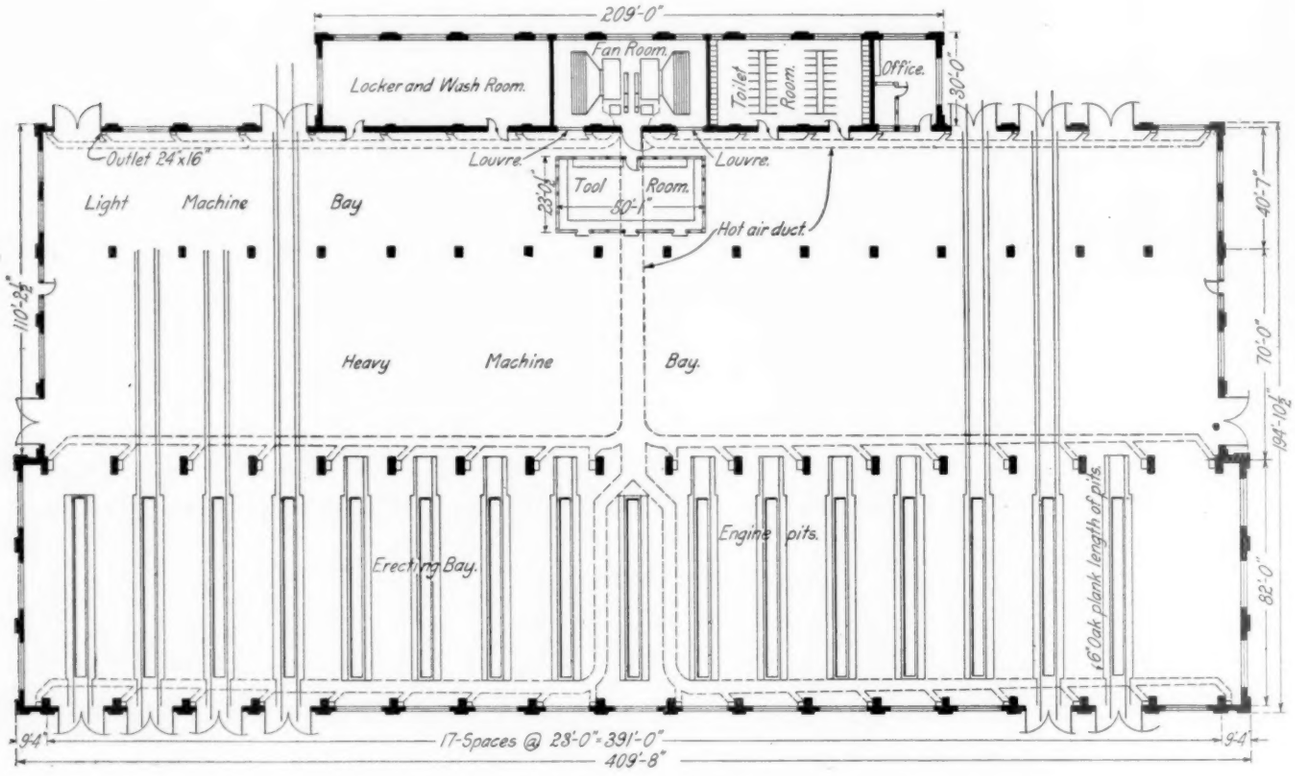
tool room occupies a large portion of the three central panels of the light machinery bay, comprising a cage 23 ft. by 50 ft. located so as to be clear of the walls on all four sides.

The erecting bay is divided by the column spacing of the building into 17 transverse panels 23 ft. wide center to center of columns and all of these panels, except the one at the south end of the building, is equipped with a track and engine pit. The tracks on six of these pits communicate with the outside through doors in the west wall of the building; five of them are also extended across the heavy machinery bay and of these, three extend through doors in the east wall. With the idea that more of these tracks may eventually be extended into the heavy machinery bay or through the west wall of the building, all underground ducts have been designed with I-beam covers at all points where they would be required to carry track loading. Several of the doors are provided with bottom sections that may be opened independently to permit the passage of a push car on the track, a detail of no little value in winter time in maintaining proper temperature in the building during extreme cold weather.

Another variation is the extension of the erecting bay 9 ft. 4 in. beyond the ends of the end bents of the structural steel framing, thereby making this bay 18 ft. 8 in. longer than the rest of the structure.

The wall and column loads of the structure are carried on natural foundations about 7 ft. below grade with the aid of reinforced concrete spread footings. The floor is of concrete 5 in. thick covered with a 1½-in. layer of Johns-Manville mastic. The engine pits have walls 3 ft. thick to provide ample jacking space outside the rails and they have reinforced concrete bottom slabs. Where the tracks are not supported by the engine pits, the concrete floor construction is dropped so as to pass under the ties.

An abundance of natural light is afforded by large window areas forming about 50 per cent of the total wall space in addition to the glass areas of the monitor and saw tooth roof. About 17,000 panes of glass are used, all set in fenestra sash. With the exception of the three lower tiers of panes which are fitted with clear glass, the glass used in the building is factory ribbed wire glass. An ample proportion of the sash in the walls and roof lights are pivoted to provide for ventilation. These are operated by chain pulls.



General Floor Plan of the New Cheyenne Shop

Structural Features

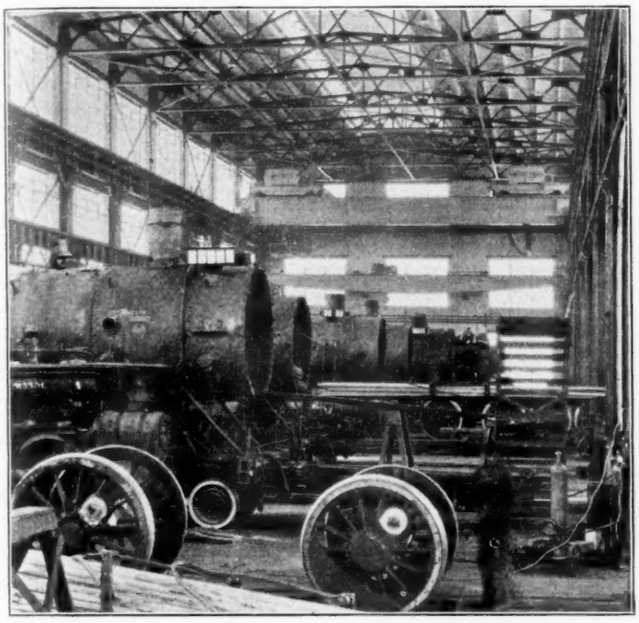
The building embodies no marked departures from usual practice in industrial building construction, and comprises a structural steel frame with brick walls and large glass areas. The erecting bay has a monitor type roof while the two machinery bays are equipped with longitudinal saw teeth. One departure from usual construction is seen in the combination of structural steel and timber in the roof construction. The supporting trusses are of structural steel while the monitor on the erecting bay and the saw teeth on the other two bays have timber frames. The roof purlins also are all of 6-in. by 14-in. timbers. The roof planks are 2-in. by 6-in. D. & M., covered with tar and gravel roofing except that the roofs of the saw teeth are covered with 24-gage galvanized Toncan metal with standing seams.

Natural illumination is afforded by Mazda electric lamps in enameled steel reflectors secured to the bottoms of the roof trusses. In the erecting bay, there are two 750-watt lamps to each bay, in the heavy machinery bay two 500-watt lamps and in the light machinery bay two 300-watt lamps. All current used in the shop is purchased from the Cheyenne Power & Light Company, being received as 2,300-volt, 60-cycle, three-phase, alternating current which is reduced by transformers to 440-volt, three-phase, 60-cycle current. Rotary converters are also provided to supply 230-volt direct current which is used to operate the cranes.

Ample Heating Capacity

The plant is heated by the forcedraft, hot-air system now so commonly applied to industrial buildings. The heating

plant occupies the central portion of the lean-to structure as mentioned above. Here two No. 17 Bayley fans having 85-in. wheels, 7/8 housed, take air heated in steam coils and drive it through underground conduits to various parts of the house. The heating plant for each fan comprises five Chinook steam heater units. No air inlet duct is provided



The Heavy Machinery Bay Is Well Lighted

to communicate with the outside of the building. Instead the inlet ends of the heaters are open to the interior of the room about 5 ft. clear from the two side walls. Thus, the air may be taken either from the outside through windows along the outside wall of the room or from the interior of the shop through louvres in the wall separating the fan-room from the shop. The fans are operated by 75-hp. 60-cycle, 440-volt, induction motors. The fans and heaters are designed to deliver 210,000 cu. ft. of air per minute and raise the temperature from 20 deg. F. to 130 deg. F. Actual tests during the past winter demonstrated the ability of the heating plant to keep the shop comfortably warm during extremes of temperature and high velocity winds. To safeguard the heating plant against failure of steam line, two independent steam pipes from the power plant serve the steam coils.

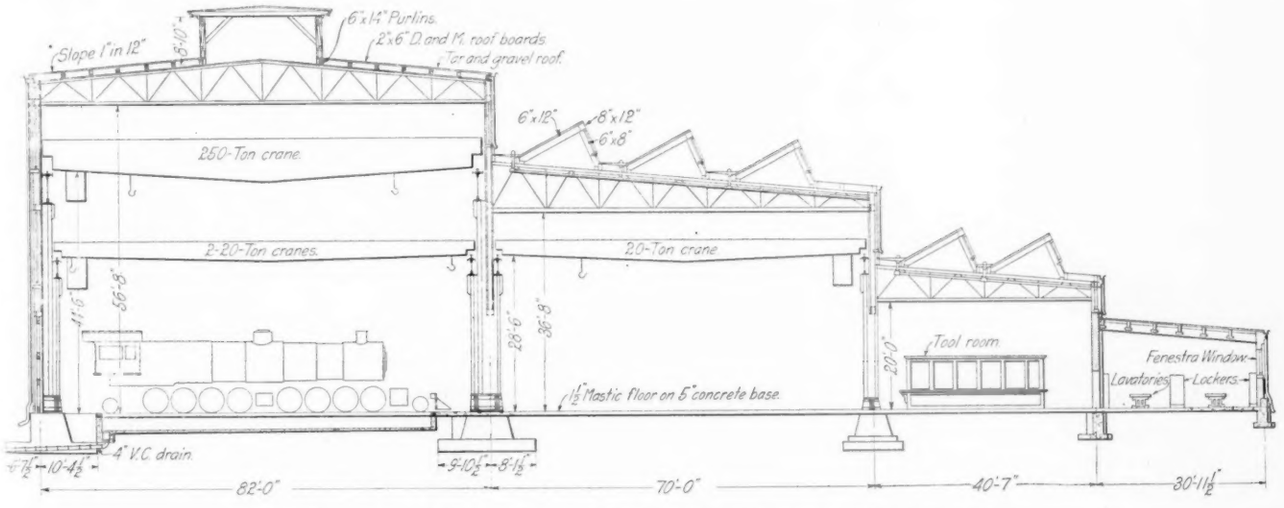
The distribution system for this heating plant consists of a main conduit extending across the house with north and south laterals extending along the east and west walls of the shop and along the line of columns between the two main bays of the building. One feature of the distribution system is the delivery of the air into the room through sheet metal boots having outlets 6 ft. above the floor level.

Water, steam, air and electric current service is supplied in the shop building at convenient intervals. Along the west wall of the erecting bay, two 3/4-in. air outlets and two light circuit plugs are provided on every column with 2 1/2-in. water and steam connections on every alternate column. On all of the columns between the erecting bay and the heavy machinery bay, there are two 3/4-in. air connections and two electric light plugs, while on every alternate column there is an electric outlet for power current. A 2 1/2-in. water hose connection is provided on columns at each end of the building and on one near the center.

Relation to the Old Facilities

The map of the shop yard shows the relation of the new shop to the other facilities. The new building is located between the old machine shop building and the roundhouse on the site of the transfer table that served the old machine shop and also on a portion of the ground formerly occupied by a boilershop and a tinshop. No transfer table has been provided for the new shop, it being the opinion of those responsible that the 250-ton crane in the erecting bay will afford adequate means for the delivery and removal of locomotives.

The project for the improvement of the facilities at Cheyenne included the remodeling of the old machine shop so that it could serve as a boilershop, tankshop, steam pipe shop, etc., to take the place of the facilities removed to make way for the new building. The chief problem offered by this plan lay in the provision of some measure of locomotive repair facilities at Cheyenne from the time that the old buildings were wrecked until the new building was ready for use. Conditions were complicated still further by the fact that



The Transverse Section Gives an Idea of the Relation of the Several Bays

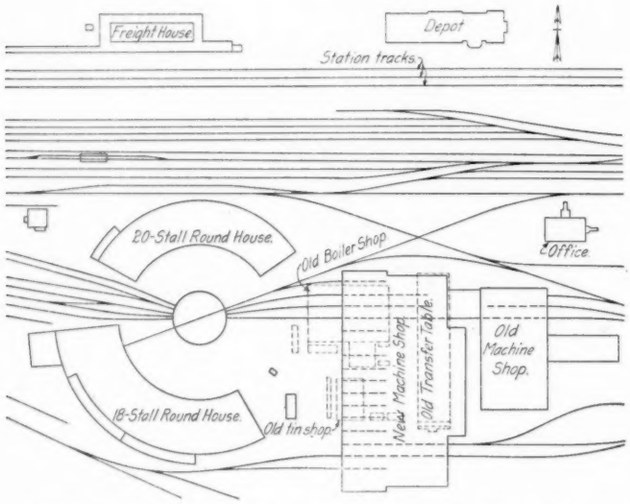
the removal of the transfer table interfered very seriously with the use of the existing shop building.

To overcome this difficulty, the doors along the west side of the old shop building which had been used for access to the transfer table were all boarded up or replaced by windows. The tracks over the four north pits in this building were extended to the east wall through which doors were cut so that these tracks could be connected with a lead on

the east side. In addition, an extra temporary engine pit was installed on each of these tracks east of the existing pits, thus making eight engine pits available in this building for locomotive repair purposes.

Additions to Power Plant

To heat the increased shop space afforded by this improvement, it was obviously necessary to increase the boiler capacity of the shop power plant. The existing power plant contained seven 256-hp. Babcock & Wilcox boilers with Laclede-Cristy stokers with space for one additional boiler of the same kind. This, however, was not a sufficient addition, so besides provision for this one new boiler the power plant was extended to make room for two 236-hp. Babcock & Wilcox, type Q14 boilers with Green stokers. In lieu of additional chimney capacity an indirect draft system was installed for the three new boilers and one of the old ones, while coal handling facilities, boiler feed pumps, feed water heaters, etc., were provided as required.



Position of the New Shop Relative to the Old Building

The new shop facilities at Cheyenne were designed and erected under the general direction of the Engineering Department of the Union Pacific, Omaha, Neb. Joseph E. Nelson & Sons, Chicago, were the contractors for the new shop building.

The Ambitious Station Agent

EVERY FREIGHT or passenger agent who supervises the work of a station employing from five to, say, fifty or more men, will answer, presumably, to the foregoing appellation; and it is assumed that he will find interest in a lecture recently delivered by E. G. Fosdick, station supervisor, before a convention of agents of the Cleveland, Cincinnati, Chicago & St. Louis, at Cleveland, Ohio, extracts from which are given below. Mr. Fosdick says:

Are we as careful and scientific in the hiring and training of employees as we should be? While a certain care is exercised in hiring, we have no specific standards to which we require an applicant to qualify. In judging an employee we have no records with which we could show a disappointed man that standards had not been reached nor maintained. In all cases the entire matter has been left to the judgment of the employing officer; so today we have some square pegs in round holes, and round pegs in square holes. I believe that there can be a set of standards established that would give the employer, by the use of test questions, some idea of the capabilities, fitness, temperament and character of each applicant. When I say test questions, I have in mind something similar to those used by the government while organizing the army and navy for the Great War. Not having such standards and not giving sufficient attention to training, we have no doubt lost many a good man who might have entered the "College of Railroading," and who might later have made a member of the "faculty" of the college.

We all know that today there is a shortage in the supply of efficient railroad executives, and I sincerely believe such shortage is due to the fact that we have not in the past given sufficient thought to the hiring and training of the beginners in the railroad game. It is true that conditions in the last few years have not been ideal with regard to the available supply of labor, and until recently we have not been in position to make our work as attractive financially as other industries. But the reward for earnest effort is as great in our business as it is in others. On us, however, is the responsibility for proper selection in the first place and for supervising the training of every new man.

This training must necessarily be such that it not only imparts knowledge of the correct and efficient way to perform multitudinous duties, but it must embrace other factors. I will name two: Personal Interest and Fair Dealing.

In one of our larger stations there are three department heads who, a few years ago, came into that organization as messenger boys. I fully believe that the reason these three young men are in the positions they hold today can be traced to the fact that some one "higher up" manifested a personal interest in their training, and thereby made them feel that they had a chance. They also worked for the reward that opportunity and application afforded them, and the result was but natural. In another one of our large stations some few years back we had the experience of hiring over 30 employees in a calendar month, and before the expiration of that same period over half of them were out of the service. And that condition prevailed to a lesser extent for some time.

Not every man or woman who may apply for railroad work would make a railroader; but if these men and women were properly selected and trained and shown the possibilities of success, there would have been no such turn-over of the employes in that particular office.

There are cases where a promising employee has been taken into an organization, and from the very fact that no one in authority took any personal interest in him or his welfare, said employee stuck to his job only for a few days or weeks; this simply because he felt that if no one was interested in him he would not get anywhere in that institution. It is said that Abraham Lincoln made it a rule on meeting and getting acquainted with a stranger to extract from that person some knowledge of his personal affairs, and then make it a point to remember it, and at the next meeting make reference to that subject. He gained their confidence and their eternal friendship as well. The employer must command the confidence and cultivate the friendship of the employee if he hopes to impart anything inspirational to him.

Fair dealing is a vital factor in training which is some times overlooked. An authority on Efficiency says:

"Men will not do what you ask them because it is easy or right or because of their pay. They will do what you ask them to do when they like you; and they will not like you unless you first like them." True friendship is fundamentally necessary; sympathy in connection with a sense of justice. Justice without sympathy is too cold and uninspiring. Our knowledge of the ability of the employee is mental and not documentary, as it should be. I believe each employer should make documentary record of the ability or disability of all employees under his jurisdiction. From such evidence of record he would be in position to deal out justice, and also to exact as much from the employee.

Importance of the Human Element in Railroading*

New York Railroad Club Devotes an Evening to Consideration of Personnel Departments and Morale

By William S. Wollner
General Safety, Fire Prevention and Welfare Agent, Northwestern Pacific

During 1919 the railroads of the United States spent $1,609,000,000 for material and $2,810,000,000 for labor. Nearly twice as much was spent for labor as for material and this makes pertinent the question whether the same thought and attention has been given to the selection and use of labor as has been used in the procuring, application and maintenance of material. Our transportation system is possibly the country's greatest purchaser of equipment, material and supplies, and this has led railroad managements to surround its purchase, application and maintenance with every scientific and practical device that will assure the securing of the material best suited to its purpose, its economical use, and proper maintenance.

But what about the human element? Is it not possible that during the rapid growth of the railroads we have lost track of the value of our man power and that we have not given nearly the attention we should have to its selection and use? Is it not possible that because all equipment, material and supplies used by a railroad is procured and disbursed through a central organization that its purchase, application and maintenance has been developed along scientific as well as practical lines, whereas, a railroad's man power is recruited from so many different sources by so many different departments and officials in so many different ways that there has not been proper opportunity for the development of a scientific plan that would assure the railroads securing the men best suited to their use and the greatest efficiency from their use after they have been secured.

Let us compare railroad operation of 40 or 50 years ago, when a man was taken into the service because of what was personally known of him to the employing officer or employee, with present day practices. A small road has two or three thousand men on its payroll, and some of the larger ones nearly a hundred thousand. Departmental lines are so clearly drawn that the employing officer who is taking a new man into the service about whose antecedents he probably knows nothing, considers how this man will fit into his own organization but gives no thought as to how he will fit into the general organization of the road. Boys and men are taken into the service to meet the need of the moment and not because of the part they are to play in the future history of the property.

Creation of Morale

There is one way and one way only in which the railroads of the United States can be made adequate to the task that confronts them and that is through the establishment of a morale that will make every man in railroad service give of the best that is in him, not because of a hope for increased returns to himself, but for the sake of the reputation of his fellow railroad men and the property upon which he is employed. His thoughts must not be of shorter hours, but of his part, small though it may be as compared with the problem as a whole, in moving the commerce of a nation. "A railroad can only prosper as does its employees, and the employees can only prosper as does the road itself." Management and employees must work shoulder to shoulder for mutual prosperity. Either or both striving only for its own prosperity will result in failure to achieve the very thing for which it is striving. Mutual understanding that both management and employees are striving for the same objective, mutual prosperity, is the first essential to the creation of a spirit of morale.

Proposed Plan for a Railroad Personnel Department

The mere fact that almost two-thirds of every dollar spent by a railroad company is paid out in wages is sufficient warrant for the establishing of a department whose sole function should be the selection of the railroad's personnel and securing efficient service from it. By the same warrant the officer in charge of the personnel department should be of equal rank at least with the officer in charge of purchases and supplies.

The personnel department should be in charge of the relation of the employee to the company from before his selection as an employee until and after he is placed upon the railroad's pension roll.

A railroad company should not be content to accept as employees those who solicit employment in its service. The initial function of the personnel department should be to bring to the attention of desirable applicants the opportunities for employment and advancement in railroad service.

It seems desirable that no vacancy be filled except upon authority from the department of personnel. This of course does not apply to common labor, but to other positions supposed to offer opportunity for advancement and where the men employed are not considered itinerants. Stated briefly, one of the most important elements in securing efficiency from the human element in railroading is to obtain the best material with which to work. It is as useless to try and secure one hundred per cent service from a fifty per cent man as it is to endeavor to operate a Mallet locomotive over a thirty-pound rail.

First Impressions

Of all impressions made upon the human mind, the first impression is the strongest and most lasting. Having selected the person it is intended to employ, the greatest care should be taken to see that he is given the proper attitude toward his employment from the very start.

Under present methods used in recruiting railroad forces the first thing that the applicant does after having been employed is to fill out a personal record form, and in many cases to subject himself to a physical examination. The very formality of this procedure gives the applicant an improper mental attitude toward the prospective position. Many questions of a personal nature, a record of past employment and references, are asked for in this form and its entire purport appeals to the man who is filling it out to be to permit the railroad company to satisfy itself that its suspicion that the applicant would prove an undesirable employee was correct. The examining surgeon passes on a great number of applicants in the course of a short day or he may sandwich these examinations into his regular practice. In any case his attitude does not seem to the applicant to be to find him in proper physical condition for employment, but rather to find physical defects that will militate

*Abstract of address before New York Railroad Club, October 15, 1920.

against his employment. How much better it would be if, upon being employed, the applicant was told in a friendly way of the company's attitude toward its employees, that it is anxious to make employment in its service as pleasant as it possibly can be made, and of the opportunities for advancement, etc.

Promotions by Merit Versus Seniority

Promotion by seniority has proven a failure wherever it has been used. The only excuse for the use of this plan is to insure the man who is one of a mass gaining promotion in due course where the fact of his being one of a great number might militate against his right to promotion. The basis of the theory of promotion by seniority lies in the belief that superior officers are not capable of selecting those fitted for promotion or that they will not exercise justice in their selection. Promotion by seniority having proven a failure, why not remove the reasons advanced against the system of promotion by merit?

It should be the duty of the personnel department to keep a card index record of every employee in the service. Most roads now maintain such records for the use of pension, and other departments. These same records could, with additions to the information now shown, be used by the personnel department. As stated before, no vacancy should be filled without the personnel department having first been consulted. Notice of a position having been vacated should be accompanied by a recommendation from the officer by whom the position would normally be filled as to the person who should be advanced to fill the vacancy. If there be an employee within the department where the vacancy exists fitted to fill the position he would of course be placed in it. If there is not an employee in line for immediate advancement the personnel department should recommend one from another department or division or office for whom it would be a promotion. In the event of there being no one in the service fitted to fill the vacant position for whom it would be an advancement, the personnel department would recommend its being filled by someone upon its list of applicants for positions.

Any employee should be privileged to call to the attention of the department of personnel what he believes to be the qualifications that entitle him to promotion. It may be that a man in train service may think that he has qualifications fitting him for more rapid advancement in some other department, and it is certain that many men do get into occupations for which they are unfitted, who would fit very well into some other kind of work. It should be one of the principal duties of the personnel department to transfer the square pegs from the round holes to the square ones.

Not only should this be done in justice to the employee but because of its dollars and cents significance to the company. The cost of employing and training a man for railroad service has been variously estimated and I will not attempt to name a figure to cover this cost for fear that the figure that I believe would cover it would astonish you. But after you have made this initial investment in a man it should not be cast aside as a total loss if there is any chance of regaining it, in part at least, through transferring the man to work that he is fitted to do rather than to discharge him from the service.

Employees' Aids

Having inaugurated a system for advancing men in the service, the railroad has the right to ask the employees to consider the possibility of advancement as part of the compensation they are receiving. In other words, the possibility of official advancement must be measured along with dollars and cents compensation.

There are maintained at present on different railroad properties throughout the United States the following aids to employees: Hospital departments, club houses, Y. M. C. A.'s, libraries, recreational and athletic associations, educational departments, mutual benefit associations, insurance funds, savings funds, stock ownership participation plans, pension funds, etc. Time does not permit of giving detailed descriptions of these various employees' aids, and as their character and plan of operation are so generally understood nothing further will be said other than that each of these aids, if properly directed, fulfills a need in the railroad service.

Railroads establish employees' aids in the hope of earning dividends on the sums invested. It is hoped that an employee will be physically benefited or that his attitude of mind will be directed in a way that will recur to the railroad in increased effort or loyalty.

While there are many ways of improving the employee's condition, and incidentally his attitude toward the company, there are two things that may be said about them all—they must not be paternalistic in character and they must be under a common direction, preferably the department of personnel. It not infrequently occurs that while a road is supporting many employees' aids it is getting practically no return from them because of the lack of common direction that results in each trying to pull the employee in its direction and, unconsciously perhaps, from the others. It is the long, strong pull of the combined employees' aids that draws out the best part of the man's nature and that is all that is necessary to assure his assuming the proper attitude toward his employment and his employer. It is the combined attitude of contented employees that spells morale.

Efficiency of the Human Element

Having provided the human element it devolves upon the personnel department to see that it functions efficiently. Studies should be made by the personnel department of the adaptability of different nationalities to different kinds of work and an attempt should be made to recruit forces in accordance with the findings. Men accustomed to directing the same operations for long periods of time sometimes overlook the possibility of increasing production through improved methods, and improvements are most often effected by minds that are comparatively new to the particular problem. The personnel department can therefore well afford to keep an oversight of all operations involving the use of the human element with the idea of suggesting changes that will increase its efficiency.

Another matter that vitally affects human efficiency and should therefore be closely watched by the personnel department is housing, which includes all the means provided employees for securing rest while not on duty. A man who has not had the proper rest is not only inefficient, but is a positive menace from the standpoint of safety. Sanitary conveniences, drinking water supplies, and other facilities having a bearing on human efficiency should come in for their share of attention from this department.

Other Personnel Department Activities

The efficiency of the human element in railroading having been assured, the next step should be to so distribute this human element as to secure the greatest possible efficiency of the plant as a whole. Just as the general distributes his forces so as to best meet the attacks of the enemy so should the director of personnel plan to meet the changing requirements of divisions, shops, terminals and other units. It is entirely too common to see men being discharged at one point of a system while every effort is being put forth at another point to fill an urgent need. Instead of releasing men from the service when they were no longer needed, under the plan suggested, the personnel department would be notified as far in advance as possible of the availability of the men for service elsewhere and it would endeavor to arrange for their transfer to the place at which their services are required.

Most railroads span distances that do not permit of the

employees or even the officials becoming personally acquainted, and the house organ (employees' magazine) overcomes this difficulty by permitting the men on one portion of the system learning what their fellows are doing elsewhere. It permits the establishing of friendly rivalry between divisions and other units of operation, and most important of all, if properly edited with this in mind, it permits of the company's bringing to the attention of the men the things that it is doing in the hope of creating morale. If this is not done the unthinking employee may accept all that is offered without realizing the necessity for reciprocity.

As the personnel department must supply the officer material as well as man power, it should by all means include in its activities an educational bureau for training men in the things they must know to fit them for promotion. The educational program must not be confined to educating officer material only, but should be active in Americanization work and providing a general education for those who did not have the opportunity of securing it before entering railroad service.

Safety propaganda offers an excellent opportunity for assisting in the establishing of morale and for this reason, as well as because it deals directly with the human element, it should be under the direction of the personnel department.

Fuel conservation campaigns, the moral hazard phases of fire prevention work, and other activities that have a morale building effect or assist in improving human element efficiency should be co-operated in, if not directed, by this department. There are so many activities that may get inaugurated by the director of personnel or in which he may assist that it is not possible to even touch upon them here.

Things to Be Avoided

The principal thing to be avoided in setting up a plan for a department of personnel is the placing of an unnatural barrier between the employee and his supervising officer or foreman. Natural lines of authority should never be interfered with and the department should exercise particular care to not participate in any way in matters affecting wages or working conditions.

While not interfering with the relations of employees to their superiors in authority the director of personnel should not overlook the necessity of a campaign of education among foremen and officials to acquaint them with the company's policy in employee relations matters and in particular with what the management expects their attitude to be toward those placed under their direction. Probably the greatest difficulty that will be encountered in endeavoring to build up morale via the plan outlined herein will be the outspoken or silent opposition of foremen and officials who have been long in the service and believe that the old ways are still the best. The best method of overcoming this opposition is by making it clearly understood that there will be no attempt to interfere with the direct lines of authority as at present established, but to the contrary every effort will be made to assist the foreman and officer by making his task of supervision a pleasanter one.

Can It Be Done?

Nothing has been here proposed that has not been successfully tried in some industry; many have proven successful in railroad operation. The main differences between the railroads and other industries are the number of men employed and the wide distances that railroads traverse, and these differences in conditions can be easily overcome if an honest desire to do so exists.

The first essential is a recognition by railroad management of the dollars and cents possibilities of the practical application of this vision. The second, and perhaps even more important element in the success of the plan, is the securing of the right man to conduct the experiment. "Many can imitate but few can initiate" was never truer than when applied to the carrying out of this ideal. Once the plan has proven successful on a sufficiently large scale to warrant its adoption elsewhere, it will not be difficult to find those who can profit through the mistakes that have been made and the successes that have been scored to follow in the footsteps of the pioneer. The finding of the pioneer whose steps will be worthy of the following will be the main difficulty.

The man who pilots the destiny of the first railroad personnel department of the scope visioned in this paper must be first of all a railroad man in all that the term applies. He must be experienced not only in a single branch of the service but must have a knowledge of as many of the departments of railroading as a single man can get in a well rounded out career, and he must most of all be a railroad man at heart having the ultimate good of the rail transportation system as his only ambition. But he must be more than merely a railroad man; he must be a man who has had a wide experience in dealing with the social problems of the age, a man experienced in all phases of industrial relations. He must not be a "company man" and he must not be a representative of the employees; he must blend the interests of the company with those of the men, and with it all combine an energy of thought and action and a sense of justice that can not be blinded by prejudice or fear or favor.

Discussion

There was a lively and prolonged discussion of Mr. Wollner's address, the meeting not adjourning until almost 11:30 p. m.

J. C. Clark, assistant to the general manager of the Oregon Short Line, Salt Lake City, Utah, spoke at some length and made many practical suggestions. In effect he said that it was advisable to organize a personnel department in order to bridge over the gap which has grown between the management and the men under modern industrial conditions. The head of the personnel department should hold a major staff position, should have requisite authority and the support of the highest executive officials.

One of the big leaks in railroad operation is caused by the labor turnover. Millions of dollars are lost every year and a thorough analysis of the labor turnover and its cost should be made on every road. Such an investigation will automatically locate weaknesses in the organization. American industries have gone into this matter thoroughly with excellent results and while the conditions differ greatly between these industries and the railroads, the underlying principles in relation to labor turnover do not differ. Mr. Clark outlined the basis on which a study of the labor turnover should be made on the railroads.

The second step in starting a personal department, according to Mr. Clark, is to organize and establish an employment service. This will include the selecting, placing and distributing of labor for all departments. Each department should report its requirements daily, so that the personnel department will be enabled intelligently to transfer men from places where there are surpluses to fill shortages elsewhere.

The personnel department should also be charged with the duty of supervising the training of the men. It is difficult to train men in the mass; in order to do this work most effectively means must be found for selecting men who are most greatly in need of instruction and then seeing that they get it. One way to do this is by means of the method of "limited impressions." For instance, the chief qualifications which are desirable should be decided upon and periodical reports should be made by their superiors covering every man in the organization. The important qualifications mentioned by Mr. Clark include intelligence, judgment, sense of responsibility, obedience to rules, vigilance or alertness, teamwork, power of observation, punctuality or steadiness,

knowledge of equipment, loyalty, character and habits, disposition and temperament. By using figures from one to ten to denote the standing of the men as to these qualifications, it is possible to average the figures and determine upon the percentage for the ability of the man as a whole. If the standings of all of the men for an entire division are averaged, then those who are below the general average will include the men who are most in need of further training and coaching; moreover, study of their report cards, assuming that at least three periodical reports have been made in each case, will indicate exactly where the men need special attention. Obviously, reports of this kind could also be used to excellent advantage in selecting men for promotion. Mr. Clark stated, however, that promotion for any position should not be given to the man who has the highest average, but the 10 best cards, say, should be selected and then a selection made from among these 10 men.

The personnel department, according to Mr. Clark, should also include a service division which should have supervision over what is ordinarily designated as welfare work, and including safety, sanitation, housing, etc., or anything that concerns the welfare of the employee. Incidentally, special attention should be given to the health of the employees, this to include periodical examinations, etc.

A. S. Lyman, general attorney of the New York Central, said that the railroads do not want college men that "dawdle" through college and don't know what they want; they need rather men who have enthusiasm and a sense of service and power. He paid a high tribute to the Railroad Y. M. C. A. and said that it inspired the men "to do right because it is right, and for no other reasons."

Robert M. Forrester, president of the newly formed Erie Railroad Company Accounting Department Employees' Welfare Association, emphasized the fact that the employee, in order to do his best work, must be happy and must not believe that the employer is trying to "put something over" on him. The association of which he is president was organized last March and represents about 1,200 employees in the accounting department at the New York office. Thirty-three delegates are elected by the different departments and are divided into three committees, known as the Welfare, Co-operative Purchase and Educational committees. The Welfare committee investigates complaints of employees and studies working conditions, the Co-operative Purchase committee has charge of a co-operative store which is doing about $1,600 worth of business a week, and the Educational committee provides lectures every Tuesday evening and is developing other educational measures.

Miles Bronson, general superintendent of the New York Central, spoke on the work of the Railroad Y. M. C. A., as did also Ward W. Adair, secretary of the railroad branches of the Y. M. C. A. in New York City. Briefly, they developed the fact that this is the only organization in the railroad field which deals with the realm of conscience, which is a most vital factor in developing safety on the railroads and securing efficient service.

W. F. Jones, general storekeeper of the New York Central at West Albany, N. Y., said that the low morale in railway service is due to the fact that the men are giving too much attention to discussing "what their rights are, rather than what their duties are."

LITIGATION OVER THE PROPOSED BRIDGE over the Hudson river at Castleton, N. Y., 8 miles below Albany, has ended and the New York Central is free to build the structure after its original design. The litigation arose because of the objection of some interests to the type of structure it was proposed to erect. The cost of the bridge which the New York Central intends some day to build is variously estimated at from $10,000,000 to $20,000,000.

Attorney General Asked for Opinion on Payment of Guaranty

WASHINGTON, D. C.

THE QUESTION as to whether any relief can be afforded to the railroads from the decision of the comptroller of the treasury that the railroads cannot receive partial payments on account of their guaranty for the six months' period ending August 31 has been referred by the President to the Attorney General for an opinion. Alfred P. Thom, general counsel for the Association of Railway Executives, had appealed to the President to use his influence to bring about a reconsideration of the decision. There is a precedent under which it is believed the Attorney General may hold that the question of how the guaranty shall be paid to the railroads is within the discretion of the Interstate Commerce Commission and that the Treasury Department has nothing to do with the matter except to honor its certificates.

There is a suspicion in some quarters that the Treasury Department has been resorting to technicalities to delay the payment of money to the railroads because it is having difficulty in providing the necessary funds and is obliged to borrow money frequently on temporary certificates of indebtedness. The Secretary of the Treasury, in an address before the American Bankers' Association on Wednesday, said that earlier plans and expectations of the Treasury Department "were disarranged by the unexpectedly large burdens placed upon the Treasury by the Transportation Act," and that "according to the estimates there will be paid on account of the railroads during the current fiscal year probably a billion dollars, of which one-quarter billion has already been called for and paid." "It is obvious," he said, "that these payments will limit the progress which the government had expected to make in the retirement of the public debt. It is expected, however, that perhaps the heaviest payments on this account will have been completed by the spring of next year."

In response to inquiries made concerning the amounts of money which have been advanced to carriers under Section 209 of the Transportation Act, on applications made by the railroads before September 1, and loaned under Section 210 of the same act, the Treasury Department has issued the following statement, showing advances and loans to October 20, pursuant to certificate of the Interstate Commerce Commission:

Total advances to carriers under Section 209, Transportation Act, 1920	$233,719,974
Total loans to carriers under Section 210,, Transportation Act, 1920	56,190,325

The carriers to whom loans have been made, and the amount of each of the loans, are as follows:

Boston & Maine Railroad	$ 5,000,000
Salt Lake & Utah Railroad Co.	300,000
Carolina, Clinchfield & Ohio Railway	3,000,000
Bangor & Aroostook Railroad Co.	20,000
Atlanta, Birmingham & Atlantic R. R. Co.	200,000
Great Northern Railway Co.	15,900,000
Western Maryland Railway Co.	300,000
Chicago & Western Indiana R. R. Co.	8,000,000
Erie Railroad Co.	8,000,000
Terminal R. R. Association of St. Louis	896,925
Seaboard Air Line Railway Co.	6,073,400
Chicago, Rock Island & Pacific R. R. Co.	2,000,000
Baltimore & Ohio Railroad Co.	3,000,000
Virginian Railway Co.	1,000,000
Kansas City, Mexico and Orient Railroad Company, W. T. Kemper, Receiver	2,500,000

DENVER & RIO GRANDE.—The sale of this road has been ordered by the federal court at Denver, Col., for November 20. No bid under $5,000,000 will be considered and each bidder will have to deposit $100,000 three days before the date of the sale as evidence of good faith. The stockholders' protective committee is preparing a petition asking for a postponement of the sale.

Railway Fire Protection Association Meeting

Every Railway Employee Should Be Enlisted in the Fight to Reduce Fire Waste

THE RAILWAY FIRE PROTECTION ASSOCIATION held its seventh annual meeting at the Southern Hotel, Baltimore, Md., this week, beginning on Tuesday, October 19, E. B. Berry (Southern Ry.) president of the association in the chair, and about 150 members, associate members and guests in attendance. The gathering was welcomed to the city by the mayor, Hon. W. F. Broening, who invited the association to take a trip around the harbor, on Thursday afternoon, on a municipal boat.

President's Address

President Berry in his address said, in part:

The splendid increase in membership during the seven years of our existence is evidence of the economic importance of our work. We have now 225 members, representing 98 railroads, working together to curtail fire waste and to create a cogent unit for progressive action and improved conditions. Our efforts for the elimination of hazards and for the installation and maintainance of adequate fire protection, must be augmented by a supreme, concerted and constant effort to enlist the interest of individual employees. Interest in fire prevention is impossible to obtain unless the individual employees comprehend the reason prompting our recommendations and the necessity for conservation. During the year 1918 over 27,000 recommendations were made by railroad insurance engineers, 14,000 of which were carried out. But the elimination of the 14,000 physical hazards did not develop a reduction in the gross fire loss. A larger percentage of the fires, with consequent loss, were caused by the careless acts of employees, and it would seem justifiable, if not mandatory, that a reasonable part of the time of inspection work be devoted to stimulating loyal and comprehensive interest in fire prevention.

The most neglected asset in industry is the brain power of our workers. Some of the recommendations of insurance engineers are carried out without the faintest idea of why the recommendation was made. If we could give the employee something to think about he would find his work interesting, congenial and attractive, and inspectors should educate the personnel of railroads to see through our eyes and to absorb some of our enthusiasm.

Loss ratio, the yard stick of our efforts must be reduced; that it can be was demonstrated in 1917 when by concentrated effort the loss ratio in railroad property classified as piers and wharves was reduced from 23 per cent in 1917 to 1.2 per cent in 1918. The abnormal loss in 1917 due to the activity of German agents bent upon destruction, forced recognition and acceptance of the personal obligation, which was immediately reflected by the reduction in loss ratio for 1918.

Standard construction and strict observance of clearance rules will without doubt ultimately develop reduced losses; but as 90 per cent of railroad structures are non-standard, we must, to obtain immediate results, develop the loyal interest of railroad personnel to the point of acceptance of individual responsibility. Fully 75 per cent of the fires are caused by failure of the human element, and the wage earner must realize that he has to contribute to replace property which is destroyed. If we can make a man think fire prevention, to guard and protect property under his care, we reduce losses, and we can class each structure in which employees are so developed as a preferred risk. A freight station or warehouse of wooden construction, with unfavorable conditions is operating with more safety from a fire standpoint if prevention features are guarded, and occupants are accepting individual responsibility, than a brick structure in which carelessness and indifference prevail. To ignore or discourage fire prevention rules is to come perilously near applying ridicule to the struggle which we are making to attain a thoroughly practical ideal. During the coming year, our membership should be obligated to enlist 200,000 railroad employees in our fight to reduce fire waste; the next year we can do more, and eventually we can find every employee consciously or sub-consciously associating fire prevention with every thought. Let us declare a moratorium on careless or haphazard acts. Until this is done we may rest assured that our goal, a reduced loss ratio, will not materialize.

Committee Reports

Following the president's address the report of the executive committee was presented by W. F. Hickey (N. Y., N. H. & H.) who congratulated the association on an increase of membership in the last year of 95 per cent. Dues received have amounted to $1,011, and the treasury is in good condition.

The committee on resolutions, E. A. Ryder (B. & M.) chairman, presented a comprehensive set of resolutions setting forth the striking facts of the enormous annual fire-loss of the United States and calling on every railroad employee to do his duty as a conserver of railroad properties. Every day should be a fire-prevention day.

The committee on statistics, G. R. Hurd (Ill. Cent.) chairman, presented a table classifying both by origin and by kind of property the fire losses on 75 railroads in 1919. The table shows losses also in 1918 but the comparison is imperfect because in the earlier year, by the action of the United States Railroad Administration, 419 roads reported. This work of the Administration, by the way, has awakened many roads so that the statistics gathered now are much more satisfactory than was the case in 1917.

The total of the losses reported by the 75 roads in 1919 was $8,560,473 in 9,194 fires; mileage of roads reporting 193,991 miles; average loss per mile of road $44.13. The chairman emphasized the more serious causes. Fires started on adjacent property, $1,158,860, caused more than double the loss of those in that class in 1918. Class 2, Ashes and Cinders, was also much larger, indicating the need of stricter regulations. Heating Appliances, Class 13, $811,378, also doubled the 1918 figures. Sparks from locomotives, Class 17, showed, however, a very gratifying decrease. Class 21, Smoking, is still heavy, indicating a letting down of well-known precautionary measures.

The committee was thanked for its good work, and every inspector is exhorted to study the report.

Bridges and Trestles

The most complete and elaborate report presented on Tuesday morning was that of the Committee on Fire Protection of Bridge and Trestles, DeWitt Rapalje, chairman. This report presented a classification of bridges and discussed the principal hazards. The precautions needed in everyday practice are set forth succinctly and numerous recommendations are made. In the year 1918 on the railroads under government operation there were 946 fires which destroyed bridge property to the extent of $461,208. This was 4½ per cent

of the total railroad fire loss for that year. Steel bridges with ballasted floors, which come next to masonry bridges, as regards safety from fire, have done good service. Ballasted floors have served well as a protection from fire of wooden bridges and trestles. Newly creosoted bridge timbers and ties should be coated with sand or cement, and boxes of sand in service, creosoted timber becomes less inflammable. The committee suggests that long wooden structures should have in the middle a concrete span to serve as a fire break. Water barrels and pails are so persistently neglected that the committee recommends the use of metal bucket tanks containing a non-freezing mixture.

Each large bridge should be treated as a special problem. Every draw-tender's shanty and the signal towers near by should have chemical fire extinguishers of 2½ gal. capacity. On bridges which cross waterways at a low level there should be provided buckets having ropes attached. Small motor cars equipped with hand pumps and suction hose to reach water below the bridge have proved of good service.

In the discussion on this report several members cited their practice in various details. Several roads have experimented with Barrett roofing on wooden decks. W. S. Wollner (N. W. P.) told of fires started by hot metal from contact shoes of electric motors and from hot brake shoes. Two fires (on bridges not supplied with barrels of water) were started by hot coals thrown out of a dining-car kitchen. Firemen who disobey the rule forbidding them to shake grates when running, start fires in that way.

The recommendation of the committee that fire-fighting apparatus should be fitted to all locomotives was criticised as too far beyond actual practice. The provision of fire pails was discussed at some length, the most novel point brought out being the United States Steel Corporation uses large numbers of powder kegs, fitted with bails, for this purpose. These are not attractive to thieves. J. H. Howland, of the National Board of Fire Underwriters, recommended two water barrels for every combustible bridge, even the shortest. The Indiana Harbor Belt operating in a dense manufacturing territory has fire-fighting apparatus on all switching locomotives; this has quickly paid for itself. M. Ryder (B. & M.) mentioned the importance of having ladders at all roofed wooden bridges.

This report was accepted and ordered printed in the proceedings, certain modifications proposed in the discussion to be first made in the text by the committee.

Inflammable Compounds and Liquids in Shops

The first report discussed on Tuesday afternoon was that of the committee on inflammable and explosive compounds and liquids in shops. The report was presented by C. P. Beistle, chief chemist of the Bureau of Explosives, chairman. It embodied an exhaustive discussion of the hazards connected with gasolene, benzine, paints, oil, waste, alcohol, lacquer and compressed gases. Gasolene, being more dangerous to handle and use than kerosene, should not be used for cleaning triple valves; and casing head gasolene should not be used in shops for any purpose. If blow torches are used for removing paint, the gasolene tanks should be in an underground pit, detached from buildings. For removing tires the committee would recommend kerosene or fuel oil rather than gasolene.

In the discussion several members cited dangerous practices which they had observed. One of them is the use of gasolene with rubber cement in fastening air-brake hose. In the offices of some shops, located in the second story, girls were found to be using gasolene to clean addressograph machines. There was a strong sentiment favorable to absolute prohibition of gasolene for heating tires. Kerosene oil is extensively used for this purpose; why not forbid anything more volatile than that? With a safe fuel this work may be done indoors, thus meeting the objection of workmen to going outdoors in cold weather. James Labor saw that on his road crude oil, sprayed under pressure, was used for heating tires; a tire can be heated in ten minutes. A light distillate, the flash point of which is 280 deg. F. is used. In many shops the use of gasolene for cleaning triple valves has been forbidden. On the New York Central there is a strong sentiment in favor of gasolene, because of the difficulty otherwise, of cleaning out the paraffine used in triples; and it is deemed desirable to provide a separate building for this work rather than stop the use of gasolene.

The committee's mention of a single form of extinguisher, the foam type, for putting out oil fires was criticised as unfair to other designs; and, after considerable discussion the meeting voted to approve all forms of extinguishers which have been approved for this purpose by the underwriters laboratory; but there was a large minority who voted against this approval.

With many expressions of praise for its thoroughness the report was accepted unanimously.

Freight Car Heaters

E. A. Ryder (Boston & Maine) was chairman of a committee which reported on freight car heaters. This is a very terse and illuminating report on hard coal stoves, wood stoves, the Eastman heater and other devices. Coal stoves, properly designed, set-up and cared for have been used with success on one road for 15 years in 100 cars equipped for l. c. l. shipments with only two small fires in that time, both due to careless loading.

Wood stoves require constant and intelligent care and the rules for maintaining proper distances between wooden fixtures and the fire, as also for providing gravel or sand under the stove, must be rigidly enforced. The Eastman heater is a wickless oil stove carried in a box under the car. The oil is carried in a 25-gal. tank, oil feeding to the burners by gravity through an automatic governor. With a tank full of oil the heater will operate from four to nine days, according to the weather. The Moore patented refrigerator heater has a stove installed in a box near the center of the car. The stove is operated from the outside and the fuel is pea coal. With all freight car heaters the responsibility for fire prevention is mainly on the agents, conductors and car inspectors.

This report had been discussed at a former meeting and the present issue is a revision with some additions. In its present form it was declared by one enthusiastic member to be a classic, and was adopted unanimously.

In the brief discussions W. E. Cathcart (Penn.) suggested the desirability of placarding heater cars with full details as to loading, and instructions as to needed care. Placards seem to be neglected on many roads, being left on cars after their function is accomplished. But the rules concerning explosives, which constitute a criminal status, forbid putting explosives next to a car containing a fire; and a placard is necessary to enable trainmen to comply with this prohibition. A clause recommending placards was finally ordered added to the report.

Fire Protection on Passenger Trains

This was briefly discussed, E. W. Osborne (N. P.) chairman of the committee, making an informal report. The merits and demerits of different types of extinguishers were mentioned. None of those on the market comply with all of the ideal requirements. Tetrachloride extinguishers were criticised by some as liable to be leaky; but others said there was no trouble on that point, the real trouble was absence; they were stolen. On the ferry boats of the North Western Pacific the deck hands patrol the boat with extinguishers, as many as 120 automobiles being carried on a boat at a single trip.

This report was accepted as one of progress.

The Moral Hazard

This was the title of a paper by W. S. Wollner (N. W. P.) scheduled for Wednesday but read on Tuesday. A flagrant moral hazard, for example, is where our unsuccessful farmer or merchant decides to get even with fate by committing arson. On railroads the term can be said to include damage from acts of mental defectives (trespassers), carelessness on the part of all classes, and lack of sense of responsibility. The pump man rarely seen by his super may become careless; there is a fault on the part of the employer. It is not safe to assume that the good record of a pump man—or if an agent at a lonely station, is due wholly to his competency. It may be good luck, the duty of instructions and of maintaining the human touch is inescapable.

Illustrating by the case of a proprietor with one hired helper, the speaker set forth the essential of the true relation between employer and employee, no matter what the size of the establishment, whether one or 100 or 10,000 employees.

The speaker was complimented on the lucidity and thoroughness of his essay and was given a rousing vote of thanks.

The remaining sessions of the convention will be reported in next week's issue.

D. L. & W. Wants to Capitalize Its Surplus

WASHINGTON, D. C.

A HEARING on the application of the Delaware, Lackawanna & Western for approval by the Interstate Commerce Commission of the capitalization of its surplus of about $90,000,000 by the issuance of new stock to be distributed to the present holders as a stock dividend of approximately 200 per cent, was held before W. A. Colston, director of the commission's Bureau of Finance, at Washington on October 5.

W. S. Jenney, vice-president and general counsel of the railroad, said that the proposed segregation of the company's coal properties, which it expects the commission to make a condition of any order it may make approving the increase in capitalization, could be accomplished in one of two ways that had been discussed, either by a transfer to a new company the stock of which would be distributed to the railroad shareholders, or by the formation of a new company which would give bonds to the railroad in part payment, but that in either case the railroad would retain no voting interest in the coal property, although for a time the stockholders of the two companies would be the same.

As the witness placed the minimum value of the coal properties at $60,000,000, whereas the capital stock of the railroad amounts to about $42,000,000, Mr. Colston asked if a distribution of this amount in stock of a coal company would not be equal to an additional 150 per cent stock dividend to the railroad shareholders, which with the 20 per cent now paid would make a total of 370 for one year. It was admitted that this would be so but the railroad witnesses said that they did not consider that the stockholders would be receiving anything they do not already own. Mr. Jenney said it was proposed to capitalize only surplus earnings of the railroad which might have been paid as cash dividends and that the new stock could be considered as merely a receipt for the money of the stockholders that has been used in building up the railroad. He said the company desired to increase the stock by the amount of the surplus, or such part of it as the commission would approve, less about $2,000,000 which has been invested out of railroad earnings in the coal properties.

He explained that while retaining the operation of its coal properties, the company had not been able to take advantage of the general railroad laws of Pennsylvania and had, therefore, been unable to increase its capital stock since 1877 except on two occasions—in 1909, when it merged some companies by exchange of its capital stock for that of the other railroads, which made its stock issue $30,000,000, and five years later when its stock was increased to $42,000,000 for the construction of a new line.

Up to 21 years ago, when W. H. Truesdale became president, Mr. Jenney said, no serious effort has been made to engage in a general railroad business, but the railroad had been operated to serve the coal mines. Since that time it has largely been rebuilt out of earnings, while about $30,000,000 has been expended on the coal properties to reduce mining cost. The Delaware, Lackawanna & Western and its leased line have approximately $95,000,000 of stock and $68,000,000 of bonds, of which $8,000,000 of stock and $15,000,000 of bonds are held in the treasury. The Lackawanna company proper has no bonded debt, but about 70 per cent of the system's mileage is operated under leases which provide for the payment of a fixed percentage on the stock of the leased lines. From 1853 until the present, the company's net earnings from transportation operations have been $208,476,000 and from the coal properties $66,900,000, while other income has amounted to $40,840,000. The company has paid in round numbers $14,000,00 in interest and $210,000,000 in dividends, leaving an accumulated surplus of upward of $90,000,000 and the property has been so well maintained that undoubtedly the management could have shown a larger surplus if it had desired to do so. About $40,000,000 of the surplus is in such shape that it could be distributed to the stockholders as a cash dividend.

Director Colston asked a number of questions to develop the amount of stockholders' contribution or "sacrifice" in the way of original investment. Mr. Jenney took the position that the stockholder has actually invested, in addition to the amount of his stock, the surplus earnings which might have been declared as dividends. He said that the segregation of the coal properties would not materially reduce the profits of the railroad as it never had had difficulty in declaring a dividend and increasing its surplus out of the railroad earnings alone. Director Colston asked if a 200 per cent stock dividend would not be open to criticism as stock-watering by the same persons who object to the high rate of dividend which the company now pays. Mr. Jenney said he thought public opinion would recognize the propriety of giving the stockholders some evidence of what has been done with their money if the commission, after an investigation, should give its approval of such an issue. Some discussion followed as to whether the amount of the stock could not be brought into consideration in connection with the fixing of rates. Mr. Jenney said that under the transportation act the amount of stocks and bonds has nothing to do with the valuation on which the commission fixes the rate level.

Mr. Colston read a telegram from the attorney general of Pennsylvania to the commission, which stated that if the company divested itself of its coal properties and accepted the provisions of the state constitution of 1874 it might legally capitalize its surplus and issue stock therefor, but not otherwise. R. B. Ferguson, general auditor of the Delaware, Lackawanna & Western, and G. J. Ray, chief engineer, also testified as to details regarding the company's accounts and its property valuation to show that the investment account had been kept conservatively and does not in effect reflect the full value of the property.

President Truesdale of the railroad was present and counsel offered to put him on the stand, but Director Colston replied that the other witnesses had sufficiently covered the ground. The company was given 10 days in which to file a brief. No one appeared at the hearing in opposition to the granting of the application.

Labor Board Opens Hearings On Short Line Wages

THE UNITED STATES Railroad Labor Board began hearings on October 18, at Chicago, to determine what wages should be paid employees of the various short line railroads. All of the first four sessions of the board, held on October 18 and 19, were devoted to the presentations of various electric interurban lines which maintain that the Board has no jurisdiction over the wages to be paid their employees. This dispute made it necessary for the Labor Board to divide its hearing into two parts, taking up first the solution of the jurisdictional dispute and later the determination of the wages to be paid employees of the lines not represented at the hearings which terminated with the Board's $625,000,000 award of July 20.

Oren Root, president of the Hudson & Manhattan, at the opening session, outlined the general physical and operating characteristics of that road to aid in the solution of the question as to whether or not the Board was granted jurisdiction over a road of that type by the terms of Section 300 of the Transportation Act. Following Mr. Root's testimony, the representatives of the employees present were asked to participate in the discussion and refused, stating that it was their desire that the Board first decide what roads properly come under its jurisdiction.

Mr. Root was followed by Frank Karr, representing the Pacific Electric, who besides outlining the general physical and operating characteristics of that road, outlined in detail the objections based on interpretation of Section 300 of the Transportation Act, which the electric interurban lines are making to any ruling of the Labor Board.

The afternoon session of October 18 was opened by C. E. Bickel, superintendent of the Litchfield & Madison. Following Mr. Bickel's presentation, which was similar to the testimony presented at the morning session, a discussion arose as to how it is possible to determine when an electric line is or is not part of a general system. Mr. Bickel was followed by Mr. Robinson of the Louisiana & Pacific, who requested that the presentation of that road be postponed until a later date. Mr. Robinson's request was granted.

Objects to Individual Hearings

Mr. Whitted of the Denver & Interurban, then began the presentation for that line. However, L. E. Shepard of the Brotherhood of Railway Conductors objected to individual hearings for each objecting line, stating that it would take a great deal of time and expense if the representatives of each line disclaiming the jurisdiction of the Labor Board be heard. Considerable discussion ensued as to the feasibility of the presentation of this testimony to the Board in writing. It was finally decided that those roads which desire will be allowed to file written answers with the Board. Mr. Whitted as followed by Mr. Knabb, representing the Copper Range, the Delaware & Northern and the Lake Erie & Franklin Ferry; Mr. Barron, representing the Butler County Railroad; Mr. Taylor, representing the Piedmont & Northern; F. J. Meyer, representing the Chicago, Lake Shore & South Bend and Mr. Shortell representing the Interurban Railway.

Practically all of the testimony presented at this session brought out questions as to the relation of the roads in question to their connections as to their traffic arrangements with the larger steam roads, the manner in which tickets were sold and the manner in which labor controversies have been handled in the past.

Testimony from various electric interurban lines and from representatives of their employees regarding the jurisdiction awarded the Board by the terms of the Transportation Act over lines of that character occupied both sessions of the Board's hearings on October 19. W. R. Dwyer, representing the Fort Dodge & Des Moines & Southern, and C. H. Crooks, general manager of that line, testified as to the definition of the term "interurban."

B. M. Jewell, representing the associated standard recognized labor organizations, announced to the Board that these organizations did not wish to enter into the jurisdictional dispute. He added, however, "The only thought we desire to convey is that, if you do decide you do not have jurisdiction, the Board will take into consideration the possibility that such decision might result in an interruption to the operation of traffic."

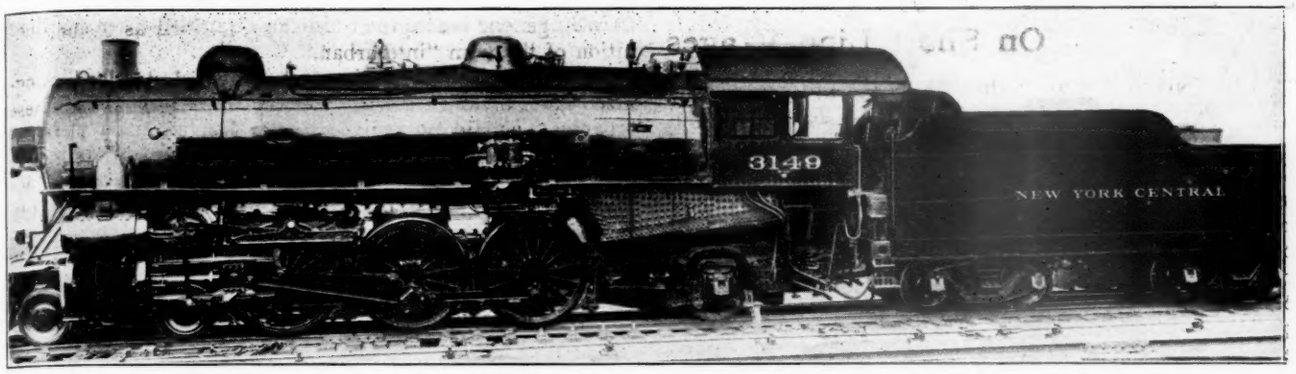
N. B. Kane, representing the American Association of Short Line Railroads, outlined the position of that organization in a short statement saying, "We think that Congress intended in the expressions used to include suburban electric railways and interurban railways because such railways are used in some sections of the country as part of system lines." Mr. Kane then urged the board to decide whether or not the lines in question were part of larger railway systems. Mr. Conners, representing the Spokane & Eastern Railway and Power Company; C. M. Cheney, representing the Interurban Railway of Iowa; P. J. Murphy, vice-president and general manager of the Lackawanna & Wyoming Valley, and S. S. Ashbaugh, representing the American Short Line Railroad Association, also presented testimony at the morning session. The latter called attention to the fact that the majority of interurban railways were wholly state organizations and that therefore the Interstate Commerce Commission is not in a position to provide the necessary revenues to be earned with which to enable the lines to pay increased wages.

At the afternoon session Mr. Kane, Frank Karr, Charles A. Henry, chairman of the Committee on National Relations of the American Electric Railway Association, and J. G. Luhrsen, president of the American Train Despatchers' Association, testified at various times, the latter opposing the elimination from consideration of any of the electric lines cited to appear before the board.

Wednesday's session was likewise devoted to the presentation of evidence in the jurisdiction dispute. P. W. J. Smith, representing the New York, Westchester & Boston, the general counsel of the same line, and Mr. Doak testifying. All of the testimony presented by the representatives of these lines was similar to that presented on behalf of the other lines, Mr. Smith, Mr. Lambert and Mr. Homer maintaining that the Labor Board had no jurisdiction over their lines according to the terms of the Transportation Act. Mr. Doak opposed the testimony presented, stating that it is his opinion that the Board has jurisdiction over any railroad operated by electricity and ordinarily called an interurban railway company that does a freight business and has joint rates and joint rules and connections and thereby becomes a part of the transportation system of the country.

B. M. Jewell opened Thursday's session with a presentation on behalf of the complainants requesting the Board to accept the testimony offered by representatives of the labor organizations at the Washington hearings. He asked in addition that any increases made by the Board be added to the rates in effect under the Railroad Administration.

The real fight in the present hearings opened on Thursday morning when Bird M. Robinson, president of the American Short Line Railroad Association, testified on behalf of the short steam lines. Mr. Robinson vigorously opposed: first, participation by the short lines in this "machine made" controversy, and, second, the granting of any further wage increases to short line employees. His opposition to participation in this controversy was based on the charge that in reality there has been no dispute between the short line railroads and their employees, but that this controversy is based on machine made or manufactured disputes. Copies of labor organization circulars were filed with the Board to bear out this charge.

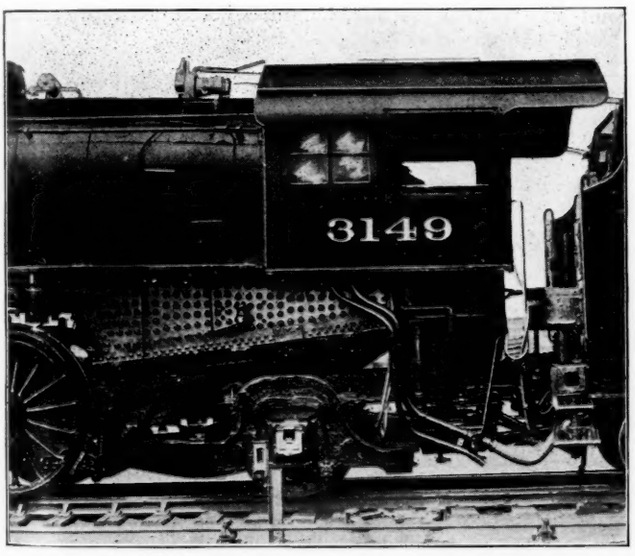


New York Central Pacific Type Equipped with Locomotive Booster

Operating Tests of a Pacific Type Booster Locomotive*

Additional Tractive Effort of Booster Increases Tonnage Rating for Division on New York Central

"IDLE WEIGHT and spare steam harnessed in a simple way to do useful work at a critical time." This, in a few words, describes the locomotive booster which causes the trailing wheels to act as driving wheels in starting the train and to get it over the hard pulls on the road. For the past ten years or more locomotive designers have been

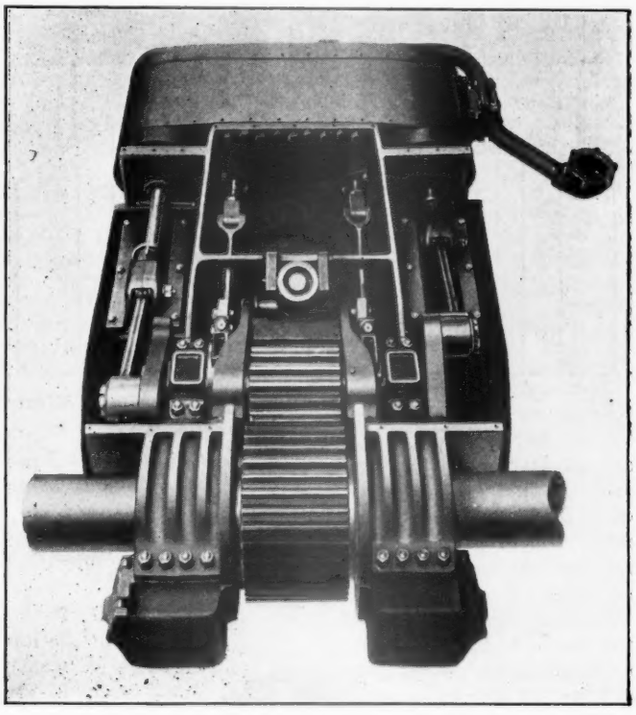


A Close View of the Trailer Truck with the Booster

striving for increased drawbar pull. Their efforts have increased the load per pair of drivers and the number of driving wheels until today the load limit that track and bridge structures will bear has been closely approached. In starting and at slow speeds every locomotive built has greater boiler capacity than it can utilize. While, of course, increased wheel loads and larger units mean greater tractive effort, the limiting factor, the ruling grade, determines the load a locomotive can haul over the division. To obtain maximum practical effectiveness from the locomotive and offset the tonnage limit imposed by the ruling grade several methods are in use. One is to station pushers at the foot of the grades to help the train over the hill; another is to make up the train, wherever possible, so as to drop several cars at some way point. Both are expensive and unsatisfactory.

Loading locomotives to the limit involves several other perplexing operating problems. A water plug located at the foot of a momentum grade necessitates cutting loose and running for water. Stopping for signal or other cause on a hill may necessitate backing down to get started again. Loss of time in starting disrupts train schedules and often results in loss of train rights with consequent overtime, as well as increased operating costs.

Locomotives as ordinarily built today are hauling around



Driving Mechanism of the Booster

a large percentage of weight that is useless except to permit of making the boiler larger. To permit train loading that would utilize a greater percentage of the available drawbar pull over the entire division and yet have sufficient power

*A description of the locomotive booster was published in the *Railway Age* of April 23, 1920, page 1251.

available for the critical points where extra power led to the invention and development of the locomotive booster.

For approximately two years Engine 3149 equipped with the booster has been in operation on the New York Central. To determine the operating advantages of the booster, a series of tests was conducted on the River division between Ravena and Weehawken. This division is 130 miles long with a ruling grade of one per cent at Bogota going west and 0.46 per cent at Haverstraw going east. The locomotive used in these tests, 3149, is of the Pacific type with a load on drivers of 184,000 lb., steam pressure 200 lb. and a tractive effort of 40,000 lb. It was exhibited at the Atlantic City convention and has been in continuous road service since that time; no special preparations were made for the test. A dynamometer car was used to obtain the necessary data.

In making these tests information was wanted on the following items:

1. Practical increase in tonnage that could be hauled over the division because of the booster.
2. Effect of the booster on train operation over the division.
3. Maximum drawbar pull with the booster in action.
4. Maximum drawbar pull without the booster.
5. Time saved over the division because of the booster.
6. Increased train acceleration by use of the booster.
7. Effect of a crew, inexperienced with the booster, operating a locomotive equipped with a booster.

Test Results Going East

The first test was made going east from Ravena to Weehawken. Without the booster, Engine 3149 is rated from Ravena with 2,600 tons and runs to Newburgh where the train line alone before the train can be started after coupling up, thus more than doubling the time lost.

In the test run the practice referred to was not followed. Engine 3149 hauled the train to the water plug intact, took water and started up the grade with the full train with the booster in operation. As shown by the dynamometer record (Fig. 2) the locomotive, with the booster in operation, accelerated to five miles per hour very quickly, the drawbar pull showing 41,067 lb. at this point and in a distance of 580 ft. the speed increased from 5 to 8½ m.p.h., or an increase of 70 per cent. When the booster was disengaged and the locomotive took the load entirely, the drawbar pull showed 33,497 lb., a difference of 7,570 lb.

RULING TONNAGE FOR WEST SHORE DIVISION

Weehawken 0 miles	Cornwall 52 miles	Distance Newburgh 57 miles	Kingston 88 miles	Ravena 129 miles
	Tonnage Going East Without Booster			
.....	.....	2,100 tons	.....	2,600 tons
	Tonnage Going East With Booster			
2,582 tons	.....	.....	.....	2,582 tons
	Tonnage Going West Without Booster			
1,800 tons	.....	2,100 tons	2,600 tons	.....
	Tonnage Going West With Booster			
2,015 tons	2,577 tons	.....	2,745 tons	.....

Reference to Fig 1 showing the road profile and Fig. 2 showing the dynamometer record clearly indicate the part the booster played in making possible the starting of the train and getting up to speed on the grade; without the booster this performance would have been impossible.

At this point an important time saving operating situation developed. Because of the time saved at Catskill, West Point was reached just three minutes before an express was due. The express was followed to Weehawken, whereas usually two or three local passenger trains are allowed to go ahead. At times this adds another 30 minutes' delay in addition to the time lost at Catskill. After leaving Catskill the booster was used for starting whenever the train was stopped for signals or other reasons, each start showing rapid acceleration.

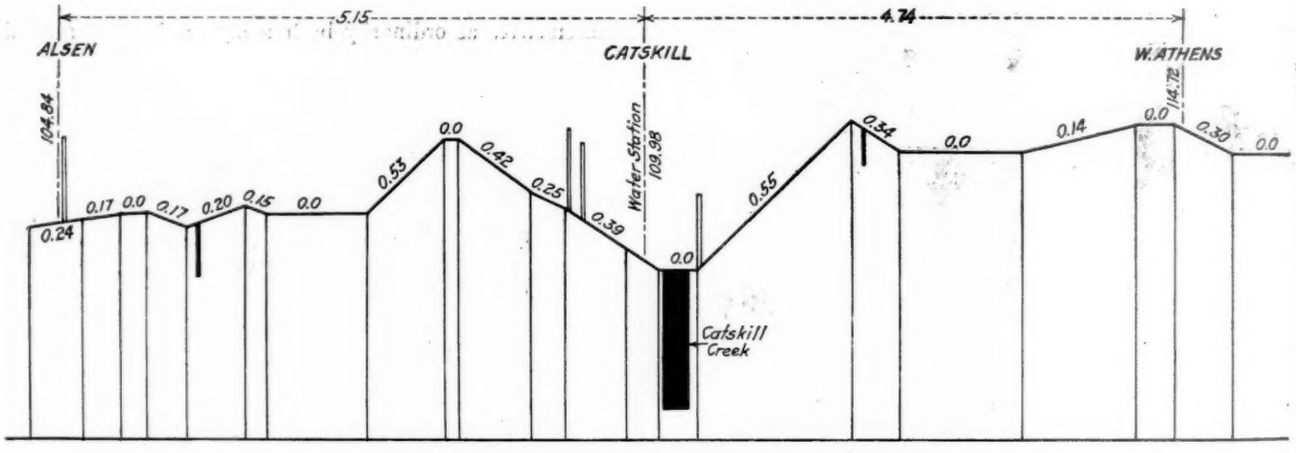


Fig. 1. Profile of West Shore Division at Catskill

tonnage is reduced to 2,100 tons, a reduction of 19.2 per cent. In making this test it was decided to endeavor to bring 2,582 tons through to Weehawken. This not only involved getting over the ruling grade at Haverstraw, but also introduced other interesting and important operating problems.

At Catskill the water plug is located at the bottom of two grades. It is the usual practice to leave the train at the top of the grade west of the water plug, run two miles for water, back up to the train and make a run down-grade to get sufficient momentum to carry over the up-grade. The profile of the road at this point (Fig. 1) shows a down-grade of 0.55 per cent and an up-grade averaging 0.375 per cent. Running for water in this way consumes 20 to 30 minutes' time in good weather. When the weather is bad with sleet and snow 30 minutes' time is usually lost in pumping up the

The ruling grade on this division is known as the Haverstraw grade (Fig. 3). It is over six miles long and the average gradient is about 0.46 per cent. This grade was approached at a speed of 33 m.p.h. with the booster idle and continuing up-grade the speed dropped as follows:

At the end of the first mile, 28½ m.p.h.
At the end of the second mile, 19 m.p.h.
At the end of the third mile, 12 m.p.h.
At the end of the fourth mile, 8 m.p.h.

At the fifth mile the speed was 7½ m.p.h. and falling rapidly. The drawbar pull was 36,441 lb. Without the assistance of the booster the train would have stalled.

At this point the booster was cut in on a 0.52 per cent grade, and in 432 ft. the speed reached eight miles per hour and the drawbar pull 42,900 lb., an increase of 6,459 lb. drawbar pull or 17.7 per cent because of the booster. In

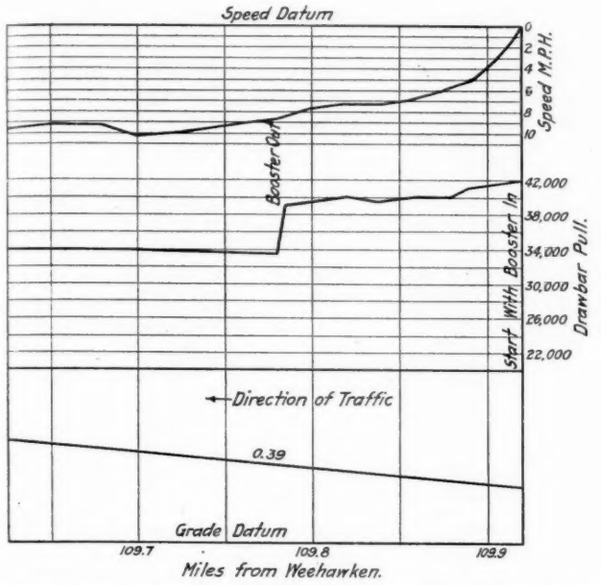


Fig. 2—Dynamometer Record of Booster Locomotive on Catskill Grade

the first ¾ mile, after the booster was working, the speed reached 10 m.p.h. This shows an acceleration, because of the booster, in three-quarters of a mile of 33⅓ per cent with a train tonnage 22.9 per cent above normal. In taking this train over the ruling grade the booster was used for about 1⅝ miles and just before being disengaged a drawbar pull of 45,080 lb. was recorded on the dynamometer car.

The train arrived at Weehawken with the same tonnage

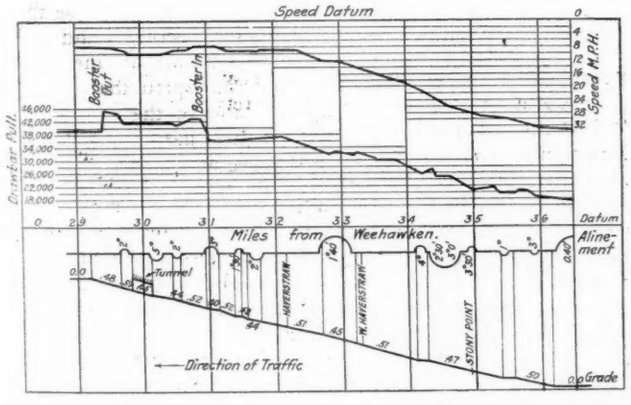


Fig. 3—Performance of Booster Locomotive with 22.6 Per-cent Excess Tonnage on Haverstraw Grade

with which it started from Ravena. This was the first time this tonnage had ever been hauled over the entire division by this type of locomotive. In addition no difficulty was experienced and the locomotive was handled by a crew not regularly assigned to the locomotive. Since this test was made the crew regularly operating this locomotive has hauled 2,618 tons over the division, an increase of 24.6 per cent over the regular tonnage.

Test Results Going West

By referring to the tabulated statement it will be noted that the tonnage rating of this locomotive without the booster is 1,800 tons to Newburgh, at which point it is increased to 2,100 tons to Kingston, where it is again increased to 2,600 tons to Ravena. Use of the booster permitted increasing the tonnage to 2,015 out of Weehawken, increasing it to 2,577 at Cornwall and again increasing it to 2,745 tons at Kingston, which tonnage was hauled to Ravena.

The ruling grade going west on this division begins 7⅓ miles from Weehawken at Bogota. It is a one per cent grade approximately 1¾ miles long. The dynamometer record was started at a point eight miles from Hohokus, where the speed was 25 m.p.h., and about two-thirds the way up the speed had dropped to 13 m.p.h. At this point the booster was cut in. As shown in Fig. 4 the drawbar pull immediately increased from 34,228 lb. to 38,793 lb., an increase of 4,565 lb.

At West Nyack a test was made to determine the combined power of the locomotive and the booster. The grade at this point is 1.04 per cent. The train was brought to a standstill and a start made by taking slack. As shown by the dynamometer car record (Fig. 5) the train proceeded .235 of a mile, where it stalled, and the maximum drawbar pull at zero speed registered 51,138 lb. The boiler pressure remained constant; the throttle was wide open and the reverse lever in the corner.

To determine the maximum drawbar pull of the locomo-

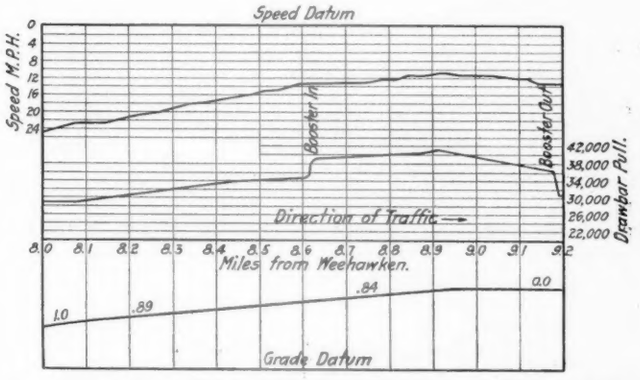


Fig. 4—Drawbar Pull and Speed Record Ascending Bogota Grade

tive without the booster a test was made on an 0.86 per cent grade into Congers, the tonnage at this point being 1,958 tons, one car having been set off on account of hot boxes. With the booster working, the train was brought entirely on the grade, the booster then cut out, and the engine proceeding until stalled. As shown by the dynamometer car record (Fig. 6) the drawbar pull registered 40,421 lb. at zero speed. To get the train moving again the booster was engaged and the maximum drawbar pull registered 49,953 lb., showing an increase of 9,532 lb., or the additional drawbar pull which the booster exerted.

At Cornwall the tonnage was increased to 2,577 tons, the usual tonnage from this point to Newburgh being 1,800 tons. At West Park, on a .52 per cent grade, it was found necessary to use the booster again as the speed had dropped to 12 m.p.h. Upon arrival at Kingston the train was increased to 2,745 tons, which is 145 tons in excess of the regular rating of 2,600 tons, and the train continued to Ravena successfully handling this tonnage.

One of the important features of the booster emphasized by these tests was the rapid acceleration, which is accomplished at practically no increase in weight, as the booster

weighs less than 4,000 lb. The following tabulation shows clearly the reason for this.

Maximum drawbar pull of locomotive	40,421 lb.
Drawbar pull of locomotive necessary to move train on given grade	36,441 lb.
Difference (force available for acceleration)	3,980 lb.
Maximum drawbar pull of locomotive with booster in operation	49,618 lb.
Less drawbar pull necessary to move train	36,441 lb.
Reserve for acceleration with booster is increased to	13,177 lb.
Deducting force available for acceleration without the booster	3,980 lb.
Increased force available for acceleration on the same locomotive with the booster operating	9,197 lb.

Hence 9,197/3,980 equals 231 per cent increase in force available for acceleration purposes.

On freight trains this is important, as it enables a quick get-away and the increase in available starting power means

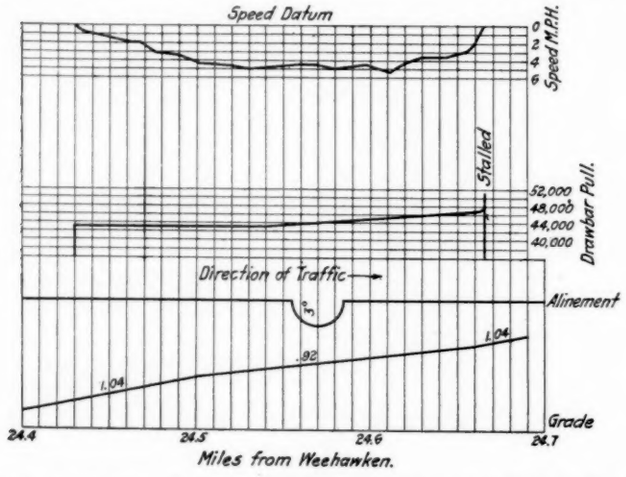


Fig. 5—Stalling Test to Determine Maximum Drawbar Pull With the Booster

a smooth even start. This often saves sufficient time to permit a freight train to continue on its run when otherwise it might necessarily have to take a siding to permit other trains

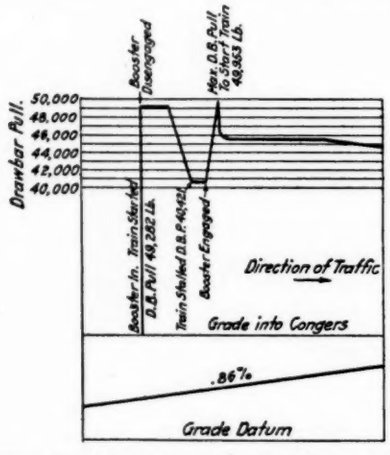


Fig. 6—Stalling Test to Determine Maximum Drawbar Pull Without the Booster

to pass. In addition, it avoids damage to rolling stock by avoiding the need of taking slack.

On passenger trains it means saving time in starting from station or other stops. A few minutes saved at each stop with a heavy train helps maintain operating schedules. The smooth easy start also adds to the comfort of the traveling public.

Conclusions

From the results of these tests the following conclusions were drawn:

1. The booster makes possible increasing the tonnage that a locomotive can haul.
2. It provides quick acceleration that helps maintain schedules more easily and reduces the time over the division. In several instances under observation the time consumed in getting freight trains out of terminals and yards was reduced 50 per cent.
3. It eliminates the need for taking slack in starting.
4. It reduces tire and rail wear as slipping of drivers is avoided.
5. Because of its smooth, steady pull at starting it reduces wear and tear on equipment and eliminates breaks-in-two.
6. It increases the average speed over grades and eliminates stalling.
7. The booster power is always instantly available at speeds below 12 m.p.h.
8. It helps relieve traffic congestion, increasing the maximum ton-miles over the division.
9. No extra coal is consumed because of the booster, and fuel economy should result because the time required over the division is reduced.
10. The booster is automatic in operation and control and adds no extra duties to the engine crew.
11. It gives the effective increase in starting drawbar pull that an additional pair of drivers would give, but avoids hauling around 50,000 lb. or more weight that a larger locomotive would involve, weight that is useless a large percentage of the time and that present track and bridge structure will not carry.
12. The booster is in motion less than 10 per cent of the time. Its maintenance is negligible.
13. It avoids stalling where sudden weather changes while enroute would render impossible the hauling of normal tonnage.
14. It provides a reserve capacity that helps to even out the difference between an experienced and inexperienced crew.

The Philosophy of Safety First*

By Marcus A. Dow

General Safety Agent, New York Central Lines

IT OUGHT TO BE a comparatively easy matter to secure the co-operation of the employer in safety work, because there is abundant proof of its value to him in dollars and cents. But figures, convincing as they are, do not in themselves alone awaken in the heart and mind that spirit that is really needed on the part of the employer and of the employee as well. If you should ever, by any chance, happen to stand on the bank of a river and you should see another human being struggling in the water, and you should hear the agonized, frightened cry of that person for help, and at once all of the spirit of bravery and chivalry and sympathy for humanity that lies in the human heart spurred you to action, and before you knew it you had your coat off and you were in the water; and after a hard struggle you brought an unconscious form to shore and you laid it on the bank and you saw it revive and breathe and live again, you would thank God that you were there and that you were given the enviable privilege of saving that life; that you had answered the call of humanity and that when the test came you had measured up to the full requirements of a real man.

The opportunity for safety service gives you the same great privilege. Real safety work is a service of the heart. Some few employers have not achieved great success, because they

*Abstract of an address before the Ninth Annual Safety Congress, Milwaukee, Wis., September 27.

were not good safety men at heart. They were not good leaders and did not make their employees feel that they were sincere. The spirit and the attitude toward safety work of any employer, or any railroad officer, will be reflected in every corner of his plant and on every mile of his road.

The employer who would render conscientious safety service must first of all make his plant as reasonably safe, well guarded, well ventilated and well lighted as engineering revision within his means will permit. Not all accidents caused by carelessness are entirely the fault of the man who was careless. The fault may have been with the man who hired him; it may have been with the man who trained him, for not having told him how to work safely and for not having pointed out the unsafe things he must not do. Or it may have been the fault of the other men who worked around him, who worked carelessly, and whose ways and habits he followed, because he was in a careless, chance-taking environment. And so a better statement and a more truthful one is that the majority of accidents are of a character which can only be eliminated when all of the employees and all of the officers co-operate in the task of creating an atmosphere of carefulness—an atmosphere of safety.

The employer, the superintendent, the foreman, must become a leader in the safety movement. Ever since the time when history first records the deeds of men, human beings have followed a leader. Good leadership has been the secret of the health, strength and prosperity of communities the world over from time immemorial. Likewise has poor leadership left in its wake untold misery, hardship, and sorrow. Assuredly as far as the supervising officer or the foreman in any industry is concerned his vigilance should extend so far as to see that the men under him are taught specifically how to do their work in the safest possible way and that they are closely supervised to see that it is done only in that way. Those in authority must not only correct the unsafe things but also by their enthusiastic support create an atmosphere of safety among the workers; not only eliminate the unnecessary hazards, but also build up a fine safety morale among the employees by their personal effort, by word of mouth, by personal contact and by that irresistible force that will come from a true service of the heart—a service performed because you believe in it, just as you believe in your religion.

"Service" Defined

If you, Mr. Safety Supervisor, tackle your problem with a determination, thoroughness and patience that will insure the elimination of every possible accident cause, you do something more than merely earn your salary. You do something worth while. If you, Mr. Foreman, by your leadership, your initiative, your enthusiasm, and your sincere, never-ceasing effort, create an atmosphere of Safety among your men, in which atmosphere the germs of carelessness cannot live, you do more than increase production in your department. You contribute to the great scheme of things which makes the world progress and become better. You give *service*.

If you, Mr. Workingman, without fear of ridicule or criticism, and spurred only by your devotion to duty, leap to the side of a chance-taking comrade who is about to perform some act that will jeopardize his own safety or the safety of a fellow employee, and with a friendly word of warning get him to correct his unsafe practice before an accident happens, you do something more than save a casualty expense for the company you work for. You, too, help to create an atmosphere of carefulness in the plant; you contribute unselfish, praiseworthy *service*.

The rarest flower ever planted, if surrounded by a bed of noxious weeds, does not attain a healthy growth and burst forth in its fullest bloom of radiant beauty. Neither can the seed of industrial safety bring forth the best of results in a shop that is surrounded by a community where public safety is forgotten and where the weeds of carelessness and indifference are permitted to flourish unchecked. The co-operation of employers is needed by the community in establishing an atmosphere of safety in public places. It is needed in the shape of influence to bring about the teaching of the fundamental principles of self-preservation to the children in our public schools. It is needed in the effort to impress upon the drivers of automobiles a sense of responsibility in safeguarding the lives of pedestrians by eliminating reckless, thoughtless driving. The opportunity for Safety Service is indeed unlimited; the field is unbounded and the insistent call for that service is not to be denied.

The Transportation Act— Its Effect on Credit*

By John J. Pulleyn

President Savings Banks Association of the State of New York

THOSE WHO FORECAST economic affairs may find in the bettered railroad situation a basis for improved business conditions during the coming years. Succesful railroad operation is fundamental to commercial prosperity, to enlarging foreign trade, to the prompt liquidation of seasonal bank credits and to the improvement of the general investment market.

Immediately prior to the time the nation's railroads went under federal control they faced a tremendous test of the sufficiency of private management under then existing laws and regulations. They could not adequately meet the expanded industrial requirements of the country alone, without respect to quick preparation necessary to mobilization for war.

The three adverse rate decisions of the Interstate Commerce Commission (the advance in rates case in 1910; the 5 per cent case in 1914, and the 15 per cent case in 1917), served to widen the breach between the government regulatory agency, the shippers and the railroad operating officials. A study of these cases is convincing of the irrelevancy of evidence introduced by representatives of the railroads to the underlying causes making impossible a satisfactory adjustment owing to the then existing conditions.

The conflict of state and federal regulation had become acutely oppressive to the railroads. The Railway Executives' Advisory Committee conducted a nation-wide campaign to place before the public the troubles of the railroads, but there it ended. The market values of rail securities had been steadily declining since 1910, when in 1916, they took a temporary rise to drop precipitately thereafter. The railroad brotherhoods with increasing strength and influence at Washington passed the Adamson act.

This combination of circumstances, together with the war emergency, required and made desirable federal control; it required a study of the solution begun with the Newlands committee in 1916-1917, and then by the more recent and protracted investigations by the Interstate Commerce Committees of the Senate and House of Representatives; it required railroad management to take inventory; the shippers and public to take account of their deficiencies in respect to sufficiently compensated transportation.

The interest of banking and investment institutions throughout this period of railroad conversion had necessarily been most direct. The studies and activities of the American Bankers' Association and its several sections added much to

*From an address before the Annual Convention, American Bankers' Association, at Washington, D. C., October 19, 1920.

the constructive thought of the period. The railroad bond holdings of all classes of banking institutions in the United States amount to over $1,700,000,000. More than one half of this is owned by the 634 mutual savings banks. These holdings, together with those of the life insurance companies, total almost $3,500,000,000. Such holdings constitute the bulk of underlying railroad securities. They represent the primary ownership of the roadbed. Our institutions have seen these securities increase in yield from 4½-5 per cent in 1916 to 5.77-7.69 per cent on September 1, 1920, or an increase of 28 per cent to 54 per cent in yield, with a corresponding decrease in market values.

Unquestionably the railroads reached their low ebb of credit and net earnings at the period of their return to private ownership last March. The first six months of railroad net earnings for 1920 are unprecedented for their poor showing. Never have the railroads shown a relatively poorer general statement. The cost of operation—the result of wage increases, higher prices of material, fuel, supplies and other large expenses of railroad operation—had reached the highest levels in railroad history. The railroads particularly during this six months period had to meet the severity of the winter, the "outlaw" strike in April, the congestion of traffic and the resulting embargoes, the car shortages and labor troubles at terminal points, all seemed to provide the darkness before the dawn of railroad credit rehabilitation.

Two elements in the Transportation Act of 1920 make the act the greatest piece of constructive railway legislation since the federal land grant acts of 1863 and 1866. They are, first, the appropriate means for the return of the carriers to private management, and, second, the definite regulatory policy of Congress by mandate to the Interstate Commerce Commission. Without these provisions it is certain that general bankruptcy and disorganization in the nation's railway system would have followed.

These elements and how they affect banking and the securities which our institutions own, I deem of chief import to this discussion. Our own status, the prosperity of our customers, the very stability of the country's economic affairs, rests upon adequate transportation facilities. Adversity in transportation spells disaster in business.

The operation of the Transportation Act marks a new era for the railroads. It is only because of the fundamental provisions of the act that the interstate Commerce Commission was enabled to increase railroad rates to the extent necessary to maintain the solvency of the roads. Hundreds of millions of dollars have been added to the value of the total railroad holdings of investing institutions, not to mention the added value which logically must accrue to other classes of securities. There are no critics now among those who think straight. The new rates, following the large wage increases, have been favorably received. Even those affected by radical propaganda are satisfied when the real facts concerning the provisions of the act are properly explained. An intelligent optimism for the future of general business is now justified. This solution of the railroad problem is at the basis of all prosperity. It will better credit generally, for it is the keystone of our domestic life.

The splendid organization at present being established by the Interstate Commerce Commission at Washington in conformity with its increased powers provided in the Transportation Act makes that body worthy of the responsibility and confidence placed in it by the last Congress. Every department is being organized to serve transportation in the public interest. Co-ordination and co-operation, rather than discord and misunderstanding between regulator and regulated, shipper and public will now result.

The effect of the new rates will prove advantageous to the medium grade railroad bonds. The high grade railroad bonds of such systems as the Pacific, Pennsylvania, Illinois Central, Burlington & Quincy; Chicago, Milwaukee & St. Paul; Northern, Atlantic Coast Line, Rock Island, Chicago & Northwestern, and the New York Central, are selling at a basis to yield less than 6 per cent, from 5.23 per cent in the case of the Illinois Central bond to 5.75 per cent in the case of the Coast Line bond. These values are as of September, 1920. Liberty bonds yield about the same rate. The return on such rail bonds marks and fully equals the prevailing rate of interest on long-term high grade securities.

The new rates should tend to give added assurance to investors that early maturities will properly be accounted for. Railroad maturities in the next five years amount to $1,352,943,588. Confidence of the investor is of immediate importance. Bankers who may be called upon for financial advice by their depositors and customers should appreciate the full meaning, from the standpoint of stabilizing railroad securities, of the new freight and passenger rates. There are now no better securities than the securities of standard American railroads. They have the freight and the passengers to carry and now with fair and equitable rates, net operating income should prove adequate. The searchlight of public opinion will now be turned on inefficiency in railroad management. Power under the act is given to the Interstate Commerce Commission to co-ordinate and to regulate railroad service, to regulate the movement of cars, and the commission can compel the railroads to purchase equipment. The commission can determine the amount of compensation necessary for the rental of cars. It has had a direct bearing upon the adequacy or, rather, the inadequacy of equipment; for when rentals were low railroads were not inclined to buy equipment, depending upon the equipment of other roads. The commission can restrict the holdings of cars. The act gives to the commission unusual powers over this industry. This power they recently used in ordering all open top cars to the coal mines to transport coal. This was considered a public necessity, although for a time it seriously affected building operations. The commission must approve any extension or abandonment of railroad line. The manner in which the commission is preparing to use these powers through efficient organization merits the confidence of the public and investor, the shipper and the railroad.

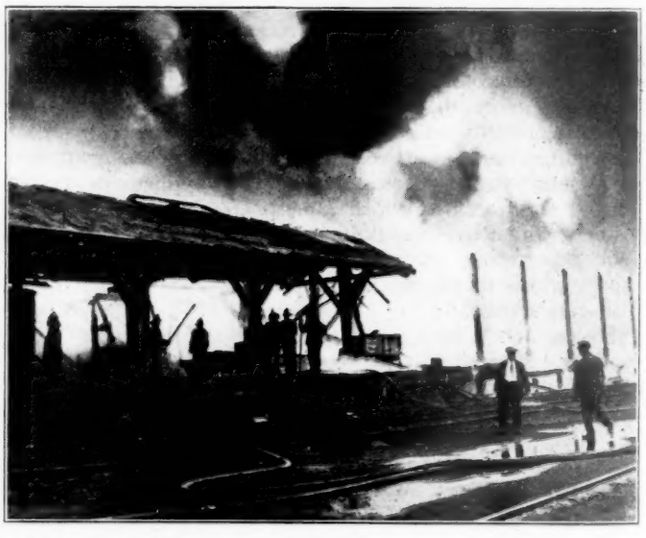


Photo by International

Firemen Attacking the Flames Which Destroyed 94 Loaded Cars and the Freight House of the Chicago Junction Recently

Car Service Division Reports Reduced Loadings

Traffic Lightens Somewhat—Box Cars Sent to Western Lines —Cars Being Returned to Home Roads

WASHINGTON, D. C.

THE VOLUME of freight traffic originated by the railroads during the week ending October 2, as indicated by the reports of revenue freight car loading compiled by the Car Service Division of the American Railway Association, was greater than that for the corresponding weeks of 1919 and 1918, but less than for the two preceding weeks of this year. The report shows that 975,946 cars of commercial freight were loaded on the Class I railroads during the week, as compared with 957,596 in 1919 and 971,895 in 1918. Increases as compared with 1919 are shown in the Allegheny, Northwestern, Central Western and Southwestern districts, but decreases were reported for the Eastern, Southern and Pocahontas districts. There were increases in the loading of coke, forest products and ore, but decreases in grain and grain products, livestock, coal, merchandise and miscellaneous.

In the report of freight car loadings as published in last week's issue, it was stated that the total for the week ending September 25 was 994,687 in 1920 and 987,041 in 1919. A correction has since been made in the 1919 figure to 995,901. The report for the week of October 2 is as follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, FOR WEEK ENDED SATURDAY, OCTOBER 2, 1920

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total Revenue Freight Loaded: This year, 1920	Corresponding year, 1919	Corresponding year, 1918	Received from Connections: This year, 1920	Corresponding year, 1919	Corresponding year, 1918
Eastern	1920	5,931	2,619	51,877	3,582	7,821	11,777	47,371	100,248	281,226	.....	.....	259,813	.....	.....
	1919	7,215	2,980	57,242	2,565	7,952	3,938	26,032	125,290	.....	233,214	227,002	.....	257,547	250,268
Allegheny	1920	2,539	3,246	63,213	6,458	3,702	15,308	38,078	73,259	205,803	.....	.....	144,771	.....	.....
	1919	3,357	3,166	62,619	8,696	4,577	9,038	41,618	69,853	.....	202,924	217,122	.....	145,556	187,747
Pocahontas	1920	147	286	24,180	676	2,047	239	2,871	7,542	37,988	.....	.....	19,515	.....	.....
	1919	175	430	24,547	553	2,149	264	135	10,273	.....	36,526	40,782	.....	19,989	25,491
Southern	1920	3,122	2,364	24,758	1,563	19,764	2,965	37,072	34,963	128,561	.....	.....	75,611	.....	.....
	1919	3,106	2,882	25,952	256	19,163	2,596	21,054	55,651	.....	130,859	127,379	.....	73,450	72,914
Northwestern	1920	16,344	9,732	12,059	1,599	16,326	45,182	28,587	38,282	167,111	.....	.....	57,876	.....	.....
	1919	13,943	9,945	13,679	906	15,922	27,334	22,996	47,107	.....	151,832	171,348	.....	90,521	84,662
Central Western	1920	11,050	12,460	25,331	419	5,989	3,109	31,261	48,251	137,770	.....	.....	64,945	.....	.....
	1919	11,268	13,581	23,315	373	5,929	2,758	23,699	55,186	.....	136,059	127,999	.....	70,520	67,949
Southwestern	1920	4,355	2,383	6,179	154	8,103	368	17,358	28,517	67,487	.....	.....	51,141	.....	.....
	1919	4,726	3,059	7,157	89	7,494	305	12,753	28,599	.....	64,182	60,263	.....	53,610	48,069
Total, all road	1920	42,488	33,090	207,597	14,441	63,652	78,948	202,598	333,132	975,946	.....	.....	673,672	.....	.....
	1919	43,789	36,043	214,511	13,438	63,186	46,233	148,287	392,109	.....	957,596	.....	.....	711,193	.....
	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	971,895	.....	.....	737,090
Increase compared	1919	.....	.....	.....	1,003	466	32,715	54,311	.....	18,350	.....	.....	.....	.....	.....
Decrease compared	1919	1,301	2,953	6,914	.....	.....	.....	.....	58,977	.....	.....	.....	37,521	.....	.....
Increase compared	1918	.....	.....	.....	.....	.....	.....	.....	.....	4,051	.....	.....	.....	.....	.....
Decrease compared	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	63,418	.....	.....

*L. C. L. merchandise loading figures for 1920 and 1919 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1919. Add merchandise and miscellaneous columns to get a fair comparison.

The deferred car requisitions (car shortage) for the week ending October 1 show a further reduction to 80,141, as compared with 89,947 for the preceding week. Of the total 41,198 were box cars and 23,930 were coal cars.

The freight car accumulations for the week ending October 8 show a further reduction to 41,135 of which 17,952 were held for export and coastwise movement.

Number of Cars Held With Company Material Reduced

Charges are sometimes made against the railroads that they are themselves wasting cars by holding an undue number of cars under load with company freight. A constant check of this situation is kept by the Car Service Division and individual instances which seem to indicate excessive holding of cars for this purpose are brought at once to the attention of the officers of the road involved. The report for the week ending October 8 shows that a large reduction in the total of cars thus held has been made during the year. Only 37,017 cars were held under load with Company material as compared with 39,014 for the preceding week. On January 1, 1920, the total of cars so loaded was 54,000.

Box Cars Relocated

Under orders issued by the Car Service Division of the American Railway Association and by the Interstate Commerce Commission, 106,247 empty box cars have been forwarded from eastern and southern to western railroads from May 25 to September 15, and during the past three weeks additional orders have been placed by the Car Service Division for the movement of empty box cars to western roads at the rate of 1,185 a day for 30 days. These orders have been issued primarily for the purpose of increasing the car supply in the grain loading districts, but as they provided for the movement of cars of western roads ownership, preferably that of the lines to which they were delivered, the orders also serve the purpose of relocating the freight cars more in accordance with ownership.

In addition to the cars sent to western roads from roads in the east and south, a considerable number of cars has been relocated between roads in the western districts. The grand total of box cars forwarded empty under relocation orders from one road to another, in the interest of equitable car distribution, from May 25 to September 15, has been 185,288, of which 165,925 have been reported as received by the destination roads, and the orders now in effect provide for the total movement of 60,600 additional box cars, of which 35,550 are for western roads. Similarly, about 150,000 open-top cars for coal loading have been relocated in the interests of increased coal production. A statement issued by the Car Service Division says:

"At the termination of federal control on March 1, the

freight equipment in the United States was badly distributed when considered from the viewpoint of ownership. The trend of traffic had been such that there were too many box cars in the east and too many coal cars in the west. Following the armistice there was a considerable reduction in the demands for transportation, which made it possible to store up a reserve surplus of box cars on western railroads preparatory to handling the 1919 grain crop. At one time this reserve amounted to 68,000 cars. On account of the greatly increased transportation demands coincident with and following the grain movement in that year, in connection with transportation conditions made more difficult by bad weather and labor disturbances, the spring of 1920 found the western railroads poorly prepared as to distribution of box car supply to meet the demands anticipated in connection with an unusually heavy wheat crop, followed by a record-breaking corn crop. On June 1 of this year the western roads had on their lines 89.3 per cent of the number of box cars they owned, or 47,917 less cars than they owned, because, this section being a producing territory, the cars had been sent east under load. By September 15 this had been increased to 92.3 per cent after taking care of the current movement in the meantime, and the later orders should further increase this percentage. The number of cars actually delivered to them since that time amounts to over twice the number of cars they were short as compared with their ownership on June 1. This relocation movement has been particularly difficult because of the great demand for cars in all sections.

"Although the total car supply in the country is inadequate, an effort has been made to distribute the cars as equitably as possible, in relation to the ownership of the cars and the needs of commerce. In general the railroads have provided themselves with the types of cars best suited for the traffic of their respective territories and also car repairs can be more satisfactorily made on the "home" roads. But 21.9 per cent of all the cars were on their home lines on March 1 as compared with 44 per cent at the end of 1917.

"Therefore, relocation is important in the program of providing more service to the public by promoting a better condition of repairs generally. The relocation orders, however, represent a method of dealing with unusual conditions and now that an approach has been made to giving each district a number of cars equal approximately to its ownership, instructions have been issued for the establishment of a plan of equalization in interchange between railroads so that each road in general will receive from its connections as many cars as it delivers to them, loaded or empty. This plan should operate to enable each district to maintain a supply of cars approximating its ownership, but to meet the necessities of local situations, some relocation orders will still be necessary and to accommodate the demand for cars for the grain movement, orders now in effect require eastern roads to deliver to western lines at Chicago, Peoria and St. Louis a designated number of cars per day in excess of the number required for equalization. These cars are being distributed between the roads in the west in such manner as to give quick relief to the roads whose supply is below the average and particularly to lines that have been losing cars in the past month by reason of heavy eastbound shipments."

Cars Being Returned to Home Roads

The report for October 1 shows that progress is being made in the return of cars to the home lines. There was a clear 2 per cent gain from September 1 to October 1, the figure on the latter date standing at 30 per cent.

Progress is noted in all districts, and with all types of equipment with the single exception of refrigerator cars:

PERCENTAGE ALL CARS ON HOME LINES

District	October 1	September 1	March 1
Eastern A	28.5	25.8	....
Eastern B	23.0	21.0	....
Eastern C	16.5	15.8	....
Total Eastern	21.4	19.8	14.6
Allegheny	33.9	29.5	23.8
Pocahontas	35.3	31.0	17.7
Southern A	27.2	25.9	....
Southern B	22.2	21.4	....
Total Southern	24.4	23.4	19.6
Northwestern	44.6	42.9	29.8
Central Western	32.4	32.2	28.8
Southwestern	22.9	22.1	20.5
Total	30.0	28.0	21.9

PERCENTAGE ON HOME LINES BY TYPES OF EQUIPMENT

	Box	Ref'r	Gondola	Stock	Flats	All freight
October 1	18.8	43.5	36.6	37.1	35.3	30.0
September 1	17.0	46.8	33.8	35.8	34.8	28.0
March 1	11.5	....	28.6	27.2	31.9	21.9

"The results above indicated give evidence of the efforts being made individually to relocate cars according to ownership," says a circular issued by the Car Service Division. "As cars become more generally located to the home lines, increased observance of rules will become more practical and the percentage of improvement should increase in greater proportion. This result cannot come of itself but needs continued vigilance and "push" on the part of all. Instructions should be kept alive. Please reissue."

The Car Service Division has issued the following summary of general conditions as of October 14:

Box Cars.—The requirements continue heavy at practically all points. There is an increased demand for cars for grain loading. At some points grain is on the ground waiting movement. Additional orders have been placed calling for a heavy movement of box cars to western grain-carrying roads in an effort to improve the present situation. The loading of ventilated box cars with dead freight must be confined to points in direct line to home roads, in order to build up supply for heavy fall movement of perishable freight.

AUTO CARS.—There has been a decrease in the demand for automobile cars account reduced manufacturing schedules. Such cars should continue to be loaded to auto loading territory. Cars should not be moved empty except when specifically ordered.

STOCK CARS.—Demand so heavy for protection of stock loading and for building up supply on Western lines for movement of range cattle and sheep, that utmost efforts must be made to move cars to owning lines, or in accordance with specific orders issued for necessary relocation.

REFRIGERATOR CARS.—Citrus fruit from Florida and apples from northwestern territory are now moving in considerable volume, and the same can be said with respect to dairy and packing house products. Imperative that both loaded and empty refrigerators be given preferential handling, and likewise important that the loading of refrigerator cars be confined to freight requiring refrigeration. Every opportunity to hasten the release of loaded refrigerator cars should be taken advantage of.

OPEN TOP CARS.—As a result of a survey taken of the fuel stock throughout the country, it is estimated that it will be necessary that a weekly production of 12 million tons of bituminous be maintained for the balance of the coal year if the situation is tc be satisfactorily relieved. Particularly, is it important that the movement of coal to upper lake ports be speeded up. Based on the assumption that navigation will remain open until December 1, a mark of 24 million tons has been set for movement up-lake this season, but it is necessary that all railroads loading lake coal keep in touch with the situation that their allotments will be currently met. In the issuance of Service Orders 20 and 21, the Interstate Commerce Commission recognizes the seriousness of the present coal situation by extending the territory covered in former orders 15 and 16 to eastern boundaries of the states of Montana. Wyoming, Colorado and New Mexico. These orders are effective October 15, to continue until further notice, and it is expected the strict compliance with these will result in a substantial increase in coal production. The use of coal carrying cars for other commodities is now being curtailed to the fullest extent possible, and permits under Service Orders 20 will only be issued in cases of absolute necessity where the public welfare demands.

FLAT CARS.—Requirement for this type of equipment continues heavy in the Southeast for lumber and log loading, and in the Southwest for loading of cane. Demand for this type of equipment continues to exceed the supply. Flats should be promptly released and expedited to the territory as directed.

The semi-monthly report of percentages of freight cars on line as compared with ownership, for October, shows that the roads in the Eastern district on that date had 101.2 per cent of cars of all kinds, the Allegheny district had 100.9 per cent, the Pocahontas district 77.4 per cent, the Southern district 88.1 per cent, the Northwestern district 99.1 per cent, the Central Western district 94.3 per cent and the Southwestern district 106.7 per cent. The percentage of box cars to ownership on the western lines as a whole had increased to 94.2, as compared with 92.3 on September 15, showing the effect of the relocation orders.

Assigned Cars for Railroad Fuel

The Car Service Division has issued Supplement No. 1 to Circular CSD-81, giving interpretations of I. C. C. Service Order No. 18 as communicated to it by a letter from Chairman Clark of the commission. In applying the provisions of Service Order No. 18 of the Interstate Commerce Commission railroads should be governed as follows:

Cars may not be placed for railroad fuel coal loading and be not counted against the mine except where the entire output of the mine has been taken by the purchasing railroad for a period of six months or longer. It follows that cars placed for railroad fuel coal loading in excess of a mine's daily distributive share must be counted against the mine if the contract or other arrangement on which the coal is taken does not, (1) cover the entire output of the mine for the purchasing railroads, and, (2) run for a period of at least six months.

Contracts made after the effective date of Service Order No. 18 and before November 1, 1920, to expire at the end of the current coal year, March 31, 1921, and which cover the entire output of the mine for such period will be considered as contracts for entire output for a period of six months or longer within the meaning of the Service Order.

Where a coal producer operates more than one mine in the same district and sells the entire output of a mine for railroad fuel coal for not less than six months, cars assigned for such daily full output loading may be rotated from mine to mine of such producer day by day, in order, in good faith to give substantially equal working time to all such producer's mines in that district.

Where railroads purchase fuel coal in quantities measured in tons, such contracts should be revised prior to November 1st to come within the provisions of the service order if it is desired or intended to assign cars to protect loading in excess of the distributive share of the mine for any day.

Where two or more railroads together, by contract or other arrangement, take the entire output of a mine for a period of not less than six months, cars may be assigned in excess of the distributive share of the mine for any day to protect such loading.

Permits for Open Top Cars

The Car Service Division has issued Circular CSD-89, giving an outline of instructions to govern the use of open-top cars when necessary to move material other than coal or coke in a direction prohibited by I. C. C. Service Order No. 20. All permits in series Nos. 1 to 633, inclusive, which expire October 11, 1920 (except for sugar beets), will be discontinued as of that date. All permits in series Nos. 1 to 633, inclusive, which have no expiration date, and all which automatically expire as of October 19, 1920 (except for sugar beets), will be canceled as of October 19, 1920. Permits issued, effective October 14 and thereafter, will receive a new series of numbers beginning with 1,001, and will be effective for 30-day periods only.

The order of procedure in brief is as follows:

1. The consignee must make application for all permits.

2. The applicant must first consult with the carrier to ascertain if suitable cars can be procured without obtaining a permit. If the carrier is unable, after proper attempt is made, to furnish cars, he will so notify the applicant in writing.

Note.--Consignee may make application for immediate shipment to the shipper, giving all necessary details. The shipper will present consignee's application to the carrier to ascertain if suitable cars can be procured without obtaining permit.

3. When the applicant is assured by the carrier that suitable cars cannot be furnished, he will then make application through the Car Service Division of the American Railway Association.

4. Upon receipt of the application, the Car Service Division will, if the application meets with the foregoing conditions, communicate with the carrier to assure itself that suitable cars cannot be furnished without a permit.

5. When it is found that all avenues for securing suitable cars are closed, the Car Service Division will then submit all the facts to the Bureau of Service. For the sake of uniformity in policy, a responsible officer of the Car Service Division should make a recommendation as to granting or denying the permit.

6. If satisfied that the application should be granted, the Bureau of Service will draft a permit for the approval of the commission.

7. Permits for so many cars per day or other period will not be cumulative.

8. No permit will be issued for roadway material unless accompanied by a statement from the Bureau of Public Roads to the effect that the work is essential in the interest and welfare of the public.

9. No permit will be issued for industrial, municipal, federal or railroad projects unless such permit is accompanied by a statement from either a representative of the Interstate Commerce Commission or the Car Service Division who has personally investigated the project and finds that it is an emergency proposition and in the interest and welfare of the public to grant it.

10. No permit will be issued unless the applicant can show that he has made proper request upon the carrier for suitable cars and has been advised by the carrier that such cars cannot be furnished. Upon receipt of this advice, the Car Service Division will then take the matter up with the carrier to satisfy itself that proper cars cannot be furnished without the issuance of a permit.

The form of permit that will be issued under the new series, states, "the railroad company is hereby permitted to furnish open-top cars." The old permits stated that "The Commission on Car Service as agent for the railroad is hereby authorized and directed to cause said railroad to furnish open-top cars."

Railroads are required to exhaust every resource to protect requests for use of coal-loading cars by supplying other types of cars that are or can be made suitable for such loading. With the near approach of cold weather the necessity for restricting coal cars to the coal service is apparent, because of the low visible supply of coal for railroad, domestic and commercial needs.

Operating statistics for the month of July made public by the Interstate Commerce Commission show that the railroads during that month handled 15.2 per cent more freight traffic than in July, 1919, a total of 40,232,000,000 net ton miles as compared with 34,916,000,000 in July, 1919. For the first seven months of 1920 the number of tons of freight hauled one mile was 248,999,000,000, which is an increase of 17.1 per cent as compared with the first seven months of 1919. It also represents a greater volume of freight than has ever before been handled by the railroads in the first seven months of the year.

The commission's statistics also indicate some of the methods by which the railroads have been able to handle this great increase in traffic. For the month of July the number of tons of freight handled in each train was 759 as compared with 761 in July, 1919, and the average number of tons of freight per car was 29.7 as against 28, while the average mileage per freight car per day was 26.2 as against 24.1 in 1919. The average number of serviceable cars on line daily was 92.8 per cent as against 91.2 per cent in July, 1919.

The report also includes figures showing the increased cost of freight train operation for certain selected accounts, which total $1.89 per freight train mile in July, 1920, as compared with $1.54 in 1919. The increase in the cost of locomotive repairs was 7 and two-tenths cents per mile; wages of enginemen increased 5½ cents per mile; fuel 15 cents per mile; engine house expenses 1-7/10 cents, and wages of trainmen, 5½ cents. The average cost of coal per net ton was $4.25 as against $3.12 in 1919. For the New England roads coal cost $9.49 as against $5.26.

Automatic Train Control Discussed at Chicago

Two Papers Presented at Joint Meeting of Western Society and Signal Division of the A. R. A.

ON THURSDAY evening, October 21, the automatic train control problem was presented at the rooms of the Western Society of Engineers, Monadnock building, Chicago, on the occasion of a joint meeting of the Western Society and the Chicago Sectional committee, Signal division, American Railway Association. The principal feature of the evening was the presentation of papers prepared by W. P. Borland, chief, Bureau of Safety, Interstate Commerce Commission, and W. B. Murray, chief engineer, Miller Train Control Corporation. Abstracts of these papers are presented below:

The Government Viewpoint

By W. P. Borland

Chief, Bureau of Safety, Interstate Commerce Commission

Fourteen years ago the Interstate Commerce Commission was directed by a resolution of Congress to investigate and report in regard to the use of, and necessity for block signal systems and appliances for the automatic control of railway trains. The first report in response to this resolution was submitted by the Commission to Congress under date of February 23, 1907. Concerning automatic train control systems, but little information was available and no conclusions or specific recommendations were made other than that further investigations, including tests, should be made.

A Block Signal and Train Control Board, appointed by the commission in 1907, conducted exhaustive investigation in regard to automatic train control devices in use, as well as those available for use, and made experimental tests of six or eight automatic train control devices, which were installed for experimental purposes. Since the abolishment of this board in 1912, the Bureau of Safety of the Interstate Commerce Commission has continued the investigation of automatic train control and other safety devices, and has conducted additional experimental tests of devices which have been developed during recent years.

As a result of these investigations and tests covering a period of 14 years, the commission is in possession of a considerable fund of reliable information relative to automatic train control devices. During this period much progress has been made in the development of train control systems and the application of these devices to railroad operating conditions and requirements. It has become apparent, however, that but little further advancement of the art of train control can be accomplished by experimental tests such as have heretofore been conducted under government supervision. Most of the tests referred to have been made with a track installation of only a few miles and usually with only one locomotive equipped with the apparatus. But the accomplishment of the functions of a number of these devices under service conditions on a limited scale and for the comparatively short periods covered by official tests has led to the conclusion that the next logical step in their development is their installation and use in actual service on a more extended scale and for more extended periods of time; in other words, further development can properly be accomplished only by placing these devices in the service for which they are intended. This is necessary for the purpose first, of developing sufficiently rugged and reliable apparatus to fulfill service requirements, and second, to secure additional information regarding the application of these devices to meet varied operating conditions and requirements.

Three of the conclusions stated by the Automatic Train Control committee of the United States Railroad Administration in its report of December 31, 1919, are pertinent:

"1. That the relative merits of the various types of automatic train control can not be determined until further tests have been made.

"2. That more extended service tests, including complete records of performance, are necessary before a decision can be reached on the availability for general practical use of any of the devices that have been brought to the attention of the committee.

"4. That on lines of heavy traffic, fully equipped with automatic block signals, the use of train control devices is desirable."

Accident Investigations by the Bureau of Safety

As to the necessity for automatic train control devices, a study of the accident-investigation reports of the Bureau of Safety is illuminating and convincing. The following tabulation contains a summary of collisions investigated which occurred in automatic block-signal territory, caused by failure of enginemen to observe or be governed by signal indications.

TRAIN ACCIDENTS INVESTIGATED BY THE INTERSTATE COMMERCE COMMISSION, 1912-1920.

Cases in Automatic Block Signal Territory Where Enginemen Ran Past Stop-Signals

Date	Road	Place	Kind of Accident	Persons Killed	Persons Injured
1911—Sept. 4	L. S. & M. S.	Dock Junc., Pa.	xc	3	36
Oct. 19	P. Marq.	Detroit, Mich.	bc	1	44
Nov. 2	Erie	Smithboro, N. Y.	bs	1	0
Dec. 9	C. M. & St. P.	Corliss, Wis.	bc	1	3
1912—Feb. 17	Penn.	Larwill, Ind.	rc	4	11
Feb. 20	Bos. & M.	No. Adams	rc	4	2
July 4	D. L. & W.	Corning, N. Y.	rc	39	102
July 14	C. B. & Q.	Western Spgs.	rc	13	29
Oct. 18	D. L. & W.	Hallstead	rc	2	0
Oct. 27	Lehigh V.	Homet's Ferry	rc	1	1
1913—Mar. 14	Union Pacific	Gothenberg	rc	4	13
Mar. 14	Union P.	Herndon	rc	5	2
July 27	Lehigh V.	Slatington	rc	1	31
July 30	Penn.	Tyrone	rc	1	216
Sept. 2	N. Y. N. H. & H.	No. Haven	rc	21	42
Sept. 4	C. M. & S. P.	Penfield	bc	2	11
1914—Jan. 29	Penn.	Conemaugh	rc	3	5
1915—Jan. 1	C. B. & Q.	Liberty, Mo.	bc	0	16
May 17	S. P., L. A. & S. L.	Los Angeles	bc	0	4
Aug. 4	N. Y. N. H. & H.	Atlantic	xc	0	23
Nov. 24	Southern	Salisbury	rc	2	38
Dec. 23	D. L. & W.	Slateford J'n.	rc	2	9
1916—Feb. 5	So. Pac.	Jackson, Utah	rc	1	1
Feb. 7	C. & N. W.	Dunlap, Iowa	rc	4	2
Feb. 22	N. Y. N. H. & H.	Milford	rc	10	152
Mar. 29	N. Y. C.	Amherst, O.	rc	26	62
July 18	St. L. & S. F.	S. Greenfield	bc	0	31
Oct. 5	Penn.	Lewiston J'n.	rc	2	6
Oct. 23	Union P.	Bushnell	rc	2	25
1917—Jan. 17	No. Pac.	Marshall	rc	3	0
Feb. 27	Penn.	Mount Union	rc	20	5
Mar. 25	Lehigh V.	Yale, N. Y.	rc	3	1
Mar. 24	No. Pac.	Kanaskat	rc	0	3
May 26	Ft. W. & N. I.	Logansport	bc	0	9
Aug. 14	So. Pac.	Hafed, Nev.	bc	4	2
Aug. 19	Penn.	E. Pittsburgh	xc	3	2
Sept. 16	C. B. & Q.	Earlville	rc	7	3
Nov. 11	Phil. & R.	Emaus, Pa.	rc	1	0
Nov. 11	West. Md.	Garrett Sta.	bc	1	5
Dec. 29	" & O.	North Vernon	bc	8	53
1918—May 13	N. Y. C.	Schodack Land'g.	der	4	99
June 22	Mich. C.	Ivanhoe, Ind.	rc	60	128
Aug. 2	P. C. C. & St. L.	Walkers Mill	rc	3	0
Aug. 22	Erie	West Salem	rc	2	2
Sept. 10	Boston & M.	Dummerston	rc	3	25
Sept. 17	St. L.-S. F.	Marshfield	bc	14	41
Sept. 26	D. & H.	Essex Siding	bc	2	3
Oct. 14	D. & H.	Schoharie J'n.	rc	2	2
1919—Jan. 12	N. Y. C.	South Byron	rc	20	130
Jan. 13	Phil. & R.	Ft. Washington	rc	13	29
Jan. 18	Penn.	West Phila.	rc	1	10
Jan. 20	C. & N. W.	Irving Park	rc	2	10
Jan. 25	C. of N. J.	White House	rc	1	0
July 19	Lehigh V.	Upton, N. Y.	rc	2	2
July 31	N. Y. N. H. & H.	E. Portchester	rc	2	1
Aug. 9	St. L.-S. F.	Adamsville	bc	3	28
Aug. 24	W. J. & S.	Elwood, N. J.	rc	1	19
Sept. 19	N. Y. C.	Buffalo	rc	0	105
Nov. 17	Penn.	Lancaster	der	2	1
Dec. 18	N. & W.	Walton, Va.	rc	5	12

Date	Road	Place	Kind of Accident	Persons Killed	Persons Injured
1920—Feb. 15.	Ala. Gt. S.	Trussville	bc	5	1
Feb. 26.	C. St. P. M. & O.	Eau Claire	rc	0	14
Mar. 3.	C. of N. J.	Elizabethport	xc	4	17
Mar. 14.	So. Mich.	Leeper's, Ind.	rc	1	10
May 3.	O. W. R. R. & N.	Huron	bc	1	15
June 9.	N. Y. C.	Schenectady	rc	15	43
June 14.	D. & H.	Gansevoort	rc	2	1
June 15.	Bost. & Alb.	Worcester	rc	0	54

Explanation of abbreviations—rc, rear collision; bc, butting collision; xc, crossing or side collision; der, derailment. The statement of cause as given in the record shows, in each of sixteen or more cases, two or more contributing causes. In several instances the main fault was neglect to run with speed fully under control after passing a caution signal, which the engineman had seen and acknowledged he had seen. In two cases, February 20, 1912, and March 25, 1917, the fault may have been in the signal apparatus.

The Transportation Act

The Transportation Act, 1920, materially increases the powers of the commission with respect to automatic train control and other safety devices. Section 26 of the amended act provides in part as follows:

"That the commission may, after investigation, order any common carrier by railroad subject to this act, within a time specified in the order, to install automatic train-stop or train-control devices or other safety devices, which comply with specifications and requirements prescribed by the commission, upon the whole or any part of its railroad, such order to be issued and published at least two years before the date specified for its fulfillment. * * *"

The administration of this section of the law is now before the commission for consideration, and plans for carrying out its purposes are being formulated. It is the purpose of the commission shortly to inaugurate the work of further developing available train control devices, looking to their practical use by railroads in locations which may be decided upon by competent authority, and to this end it has invited the co-operation of the American Railroad Association. It has been suggested that a representative committee be appointed to co-operate with the Bureau of Safety for the purpose of working out the details of a practicable plan for effectuating the purpose of Section 26 of the Interstate Commerce Act.

The enactment of this legislation marks an epoch, from the government viewpoint, in the development of the art of automatic train control. The period of experimentation has passed; the necessity for automatic train control has been established and the question as to the practicability of automatic train control has been answered in the affirmative. The primary purpose of the former legislation, namely, to determine whether the automatic control of trains is feasible, has been accomplished, and opportunity has been afforded the proprietors of such devices to secure unbiased reports, to develope them along proper lines, and in some cases to conduct experiments and to demonstrate the merits of their devices. The termination of this period of experimentation ushers in a period of practical development. The present automatic train control problem is not one of invention, but rather one of engineering; the product of the inventor is to be taken over by the engineer and developed and applied for the useful service for which it is intended.

The recently enacted legislation contemplates that the locations where installations are to be made shall be designated and that specifications and requirements to which the devices to be installed in these designated locations must conform, shall be prescribed by the commission. There has been more or less criticism of the "requisites" and "desirable characteristics" for automatic train control systems which have been promulgated from time to time by different bodies, the burden of complaint being, on the one hand, that requisites covering all systems and operating conditions resulted in excessively severe requirements, and, on the other hand, that desirable functions and features were not specified in sufficient detail.

The terms of the provision of the present law, however, apparently preclude such difficulties. Specifications and requirements prescribed for a device which is to be installed in a designated location no doubt will cover the functions to be accomplished by the apparatus as well as the characteristics of the apparatus itself.

The installation and use of an automatic train control device by a railroad company offers far greater promise of successful application and operation than does the installation of a device of this character by the inventor or proprietor made for the purpose of an experimental test. The inventors or proprietors of these devices frequently are not signal men or competent engineers, and in many cases they have no proper conception of railroad operating conditions and requirements; the financial resources of many of them have been extremely limited. Notwithstanding these facts, such men have been given practically a free hand in making experimental installations, the principal and in some cases the only apparent concern of the railroad company being that the proper operation of trains should not be interfered with.

The administration of Section 26 of the Interstate Commerce Act will inevitably result in great strides in the development of the art of automatic train control, and I confidently anticipate that we shall shortly have in service adequate installations of automatic train control devices which will permit an engineman to handle his train without interference as long as he does so properly, but will intervene to stop his train if he disregards the stop indication of an automatic block signal or runs at excessive speed where speed restriction is prescribed.

The Problems of Automatic Train Control

By W. B. Murray
Chief Engineer, Miller Train Control Corporation

The question of desirability of the automatic train control has been answered in the affirmative by many witnesses and by some unmistakable facts. In view of the tests and records of years of actual service, it is inconceivable that any railroad officer responsible for the safe operation of trains would hesitate to favor the use of the automatic train control, provided, of course, that such devices meet his operating requirements and at a cost commensurate with results.

It has been demonstrated beyond a doubt that the display of signals or signs along the right of way or in the cab does not stop the train (in case of danger) should the engineman for any reason fail properly to interpret the signals and apply the brakes. Therefore, it is a well recognized fact today that the only way of reducing to a minimum the dangers of collisions and certain classes of derailments is through the employment of mechanical means to enforce absolute obedience to signal indications and track conditions.

The principal devices which have been tested on railroads and which are in use today are the trip type, such as the Kinsman system in the subway of New York; the induction type, in service on the Western Pacific in California; the intermittent electrical contact or ramp type in service on 19 miles of single track on the C. & O., 25 miles of double track on the Rock Island, and on 107 miles of double track on the Chicago & Eastern Illinois. The general results of the experiences with the above mentioned devices have been more or less successful and have warranted further trials and use, until today there are automatic train controls in actual service, handling all classes of trains and handling them satisfactorily, according to the testimony of officers and trainmen who are using them.

The ramp type has been in actual service on different roads long enough to answer the clearance question (at least on roads using it), to satisfy the officers as to the permanency and dependability of the different forms of construc-

tion and to answer fairly correctly the question as to cost of installation and maintenance.

The Problem of Refinement

Among the problems confronting the railroads in the installation of automatic train control is the one regarding the extent to which they desire to go in the first stages; that is to say, what functions may be desirable over and above the control or stopping of the train for stop signals? The development of the air brake and the visual signal certainly furnish the only logical example to be followed in the evolution or refinement of the automatic train control. It was only through long usage and steady development and improvement, a little at a time, that the air brake and the visual signal attained their high state of efficiency and became practically indispensable. The automatic train control development has been along similar lines and now claims the same consideration from all thoughtful railroad officers.

The automatic train control not only stops the train when there is danger ahead, but by the same installation and the laws governing it, indicates the clear signals, thereby warning the engineman that they are approaching a signal, that the signal is clear and that it is safe to proceed. To this extent the automatic train control facilitates traffic, as well as providing added protection against collisions and certain classes of derailments.

On one railroad a service application of the brakes is made when a caution signal indication is displayed and approaches a signal displaying a "stop" indication under control; on another railroad the officers decided that the first essential in operation was to insure a *stop* for a stop signal indication, so ramps were placed within braking distance of the signal, allowing the engineman to handle his brakes as his experience and judgment directed. In the main this has resulted in general satisfaction; the high speed passenger trains make a satisfactory and smooth signal stop; enginemen on freight trains lap the valve as soon as the desired reduction is obtained.

If it is necessary for the engineman to make a station or water plug stop between a ramp and a stop signal, he will bring his train under control, and by a wilful act let himself over the ramp. Under this form of operation the engineman has absolute control. But it should be specifically noted that he must perform a wilful, deliberate act at the time he is passing a control point or ramp. otherwise he will receive a brake application. *He does not cut out the control—he clears himself.*

What the Installation of Automatic Train Control Has Accomplished

It has been demonstrated beyond controversy that the automatic train control *enforces* the application of the brakes, eliminating all danger from the possible failure of the human element.

On different occasions articles have been written and statements made that the use of an automatic train control would have a tendency to make the engineman careless, but observation based on a careful watch and check extending over a period of several years' service operation on a railroad using an automatic train control shows that the contrary is true. The use of the automatic train control has a tendency to keep an engineman wide awake and on the job. This is a demonstrated fact and experienced men in the service bear testimony thereto.

Statements also have been made that the use of an automatic train control would retard traffic. The answer to these statements is that its use facilitates traffic under certain conditions, and it will enable the railroads to run more trains with added protection.

Some control enthusiasts have taken the stand that the automatic train control would take the place of the signal. This idea is erroneous and the facts all go to prove that the automatic train control is an adjunct to the roadside, or visual signal, and its primary function is to enforce obedience to fixed signal indications.

It has also been observed in years of experience that very frequently in a trip over the road an engineman will receive a caution signal indication and find his next signal at stop, when just about the time that he applies his brakes and the train is retarding, the signal will assume the proceed position. All will agree that it is good railroading for the engineman to release his brakes and proceed according to the visual indication.

The Clearance Problem

All who are familiar with the automatic train control know that an air gap of several inches exists between the locomotive and the roadbed at a line even with the top of the running rail. This gap must be bridged and thus we are confronted with one of the greatest problems, namely, clearance. The roadside or track member must not interfere with the rolling stock, or vice versa. But there is no good reason to say that the present position of roadside members is final, or that the distance out and up from the running rail is arbitrarily established. But standardization of clearances for the automatic train control will be established when the occasion demands it.

The Maintenance and Operating Problems

The maintenance of the simpler forms of automatic train controls is very low compared to the benefits derived and as compared with other devices that are in use on locomotives. It has been found that the regular engine inspectors can take care of the device the same as the other parts of the locomotive, and that repairs and maintenance are made by the regular maintainers in the different shops and roundhouses. In other words, it does not require a large force of specially trained or technical men to install and maintain the engine equipment.

The roadside or track members of the successfully demonstrated devices in use on steam service railroads today are stationary. That is, they are attached to the ties adjacent or between the running rail. Years of constant service have shown that there is very little, if any, appreciable wear on the ramps. The maintenance of the ramps is taken care of by regular trackmen, and the electrical connections are looked after by the regular signal maintainers.

So far as known, there has been no change in the book of rules brought about because of the operation of the automatic train control, and an engineman is not relieved of any responsibility nor is the discipline lessened.

In conclusion, it should be emphasized that the results of the operation of the automatic train control have conclusively proved that:

(1) It enforces obedience to signal indications and track conditions and automatically stops the train for a stop signal if the engineman fails to act.

(2) In fogs and storms it helps the engineman in the better handling of his train by giving him a clearance indication (if the signal is clear) at braking distance from the signal, and to this extent actually facilitating traffic.

(3) It performs its functions properly under all weather conditions which will permit running of trains.

THE PRICE CUTTING WAVE.—As an element in the price readjustment, the improvement in railroad transportation, which has made possible a more adequate distribution of commodities, is of no inconsiderable importance.—*Dun's Review.*

Maintenance Allowance During the Guaranty Period

Counsel for Executives Contend It Should Be Measured by Physical Condition Rather Than by Expenditure

WASHINGTON, D. C.

ALFRED P. THOM, S. T. Bledsoe and J. P. Blair, as a committee of counsel for the Association of Railway Executives, have filed with the Interstate Commerce Commission a brief in reply to the brief of the director general of railroads on the interpretation and application of the paragraph of Section 209 of the transportation act relating to the allowance for maintenance during the guaranty period. The brief of the director general, which was abstracted in the *Railway Age* of September 3, page 401, took the position that the director general's obligation during federal control, which under the act is made the basis for the allowance to be made for maintenance during the guaranty period, should be based on the expenditure of money, while the executives contend that wherever possible it should be measured on a basis of physical reparation. The original brief of the Association of Railway Executives was also published in the *Railway Age* of September 3, page 397. An abstract of the reply brief is as follows:

Cost of Labor and Materials

In view of the fact that, in the course of the negotiations which resulted in the adoption of the standard form of contract, the government declined to accept the expression suggested by the carriers as to "the efficiency of labor," where the contract undertakes to deal with the comparison of maintenance during the period of federal control, and the fact that the carriers declined to accept the expression suggested by the government as to "the price" of labor in the two periods respectively, it becomes necessary to interpret properly the term "cost of labor" which was agreed to by both parties, and which appears in the contract.

The government contends that the contract as written calls for a mere "money test," and requires only a comparison of the aggregate amount of money expended in the two periods as shown by the books—that the contract does not contemplate a comparison of the amounts of physical reparation except that, as the government contends, the parties have agreed that, for the purpose of adjusting their accounts, the comparison of physical reparation is sufficiently reflected in the amount of money expended without reference to actual physical reparation.

In other words, the director general contends that, under the terms of the contract, all questions of the condition of the property at the time it is returned has been waived by the carriers, and that the government has no responsibility whatever for this condition beyond expending an agreed sum of money.

The director general in making a contract with the carriers was acting as the agent of the president, and it can not be successfully contended that it was within his power, or that it was his purpose to disregard the assurances of the president and the act of Congress passed to redeem those assurances.

Certainly, unless the language used in the contract is susceptible of no other construction, it can not be successfully contended that the contract must be construed to disregard the physical condition of the property during and at the end of federal control, in view of the fact that both the president and Congress adopted the physical test and gave assurance to the carriers that physical condition should not only be considered, but that the condition of the property should be as good when the property was returned as when it was taken over.

If, therefore, it is possible to read into the terms "cost of labor and material" (during federal control), which are used in the contract as the things to be compared with the cost of labor and material during the test period, a recognition of the duty of the government to have regard to the physical condition and not merely a money test, then every canon of construction would require this to be done.

We respectfully submit that it is not only possible to do this, but the very language of the contract itself requires it to be done. The concluding words of paragraph (*c*) of Section 5 require that the comparison of the cost of labor and materials shall be made "so that the result shall be, as nearly as practicable, the same relative amount, character, and durability of physical reparation." When the president was assuring the carriers that there should be, under federal control, the same relative amount, character, and durability of physical reparation as during the test period, and when Congress by its enactment was requiring that the property of each carrier be returned to it in substantially as complete equipment as at the beginning of federal control, it is impossible, it seems to us, to conclude that the contention of the director general is sound that physical condition must be disregarded and the money test alone applied.

On page 17 of the director general's brief the contention is made that the "cost" of a thing is synonymous with the "price." This manifestly is true only if the thing is the same. In this case, price has reference to hourly or daily wage; cost has reference to the labor job. The price of labor by the day or by the hour is, of course, not synonymous with the cost of labor to do a certain amount of physical reparation.

If, in order to satisfy the covenant of the government, it became necessary during federal control to put into the property 100 tons of steel rails because in the period with which comparison is required 100 tons of steel rails had been put into the property, the cost of labor to do that job would in no sense be synonymous with the price of labor by the day or by the hour; and yet if the physical reparation is required to be made in accordance with the assurance of the president, with the requirement of the act of Congress and of justice to the owners, it is entitled to have that quantity of 100 tons of steel rails not only bought but put into the property, and is entitled to have the cost of doing this piece of physical reparation paid by the government.

The cost of doing the maintenance involved in putting into the property this item of 100 tons of steel rails to correspond with 100 tons of steel rails put in during the test period, would be made up of the cost of the rails plus the cost of the labor of putting them in place. The proposal of the government is to equate the hourly wage and not to equate the number of hours. It is manifest, therefore, that the contention of the government is to equate only one element which makes up the cost of labor and to omit the other.

For the purpose of testing further the correctness of the director general's interpretation of the word "cost" let us assume that a given carrier inserted on the average during the test period 100,000 ties per annum; that one hour of labor was required for the insertion of each tie, and the price of labor was 20 cents an hour. Let us further assume that during the period of federal control the price of labor was 40 cents an hour, and it required an hour and a half to insert a tie of exactly the same kind inserted during the test period under similar conditions. Under the director

general's theory the cost of insertion of the tie during federal control would apparently be only 40 cents, whereas the actual cost is 60 cents. The director general therefore, would, in determining the amount he would be required to expend for the insertion of ties during each year of federal control, multiply the amount expended by the carrier for that purpose, to wit, $20,000, by two, the price of labor having doubled, and would secure a factor of $40,000. However, inasmuch as the actual cost to insert the ties was 60 cents, the $40,000 maintenance allowance established by his method of equating would pay the cost of installation of only 66,666 ties, and notwithstanding the carrier had, on the average during each year of the test period, inserted 100,000 ties, the director general would discharge his obligation to the carrier, so far as the insertion of ties was concerned, by inserting in each year of federal control only 66,666 ties, or two-thirds of the number inserted by the carrier in each year of federal control. If, however, the director general should have in fact inserted 100,000 ties in each year of federal control he would have, in addition to the discharge of his obligation as to the insertion of ties, a further charge of $20,000 per annum against the maintenance allowance of the carrier. Can such an interpretation of the word "cost" as it appears in paragraph (*c*) of Section 5, in view of what precedes and follows that word, be justified from the standpoint of the language of the contract, the federal control act, reason or justice? Undoubtedly to get a proper equation factor for ascertaining the cost of any unit of physical reparation it is as necessary to consider the time employed in effecting such reparation as the price of the labor employed therein.

It seems to us there can be no escape from the conclusion that the term in the contract "cost of labor" must be construed, in all matters capable of physical comparison, the entire cost of labor and not a part of it only.

Of course, there are certain matters of maintenance which are not capable of a physical comparison, but, so far as a physical test can be applied, our contention is that it must be applied, because the contract states, in conformity with the assurances of the president and the requirement of the act of Congress, that, even under the proviso of paragraph (*a*) of Section 5, the physical test of reparation must be applied "as nearly as practicable."

The Director General's Primary Obligation

The contention is made in the director general's brief that the interpretation and effect of paragraph 5-(*a*) and the proviso thereto may be briefly described as each fixing an expenditure basis as the sole test without regard to the extent or character of physical reparation.

It is argued in support of this interpretation that the properties were too large and too complex to permit the ascertainment of the relative physical condition thereof at the beginning and end of federal control, or the relative amount, character and durability of physical reparation, and that this being true only those provisions relating to expenditures should be given effect. That there should in effect be eliminated from consideration the requirement of the primary obligation that the property "be returned to the companies at the end of federal control in substantially as complete repair and in substantially as complete equipment as it was on January 1, 1918," and the requirement of the proviso "that the result shall be, as nearly as practicable, the same relative amount, character, and durability of physical reparation."

The director general refers to his primary obligation as "that part of Section 5-(*a*) preceding the proviso." The purpose of the argument is to support his interpretation of the proviso by arguing that such interpretation is persuasive because in harmony with the requirements of his primary obligation. Counsel for the carriers agree that an interpretation should be given to the proviso of Section 5-(*a*) and of 5-(*c*) that will render the requirement imposed on the director general in the optional settlement he is permitted to make under the proviso as nearly as possible harmonious with the requirements of his primary obligation. It should not be assumed that separate and independent standards are set up by the primary obligation and the proviso, but that the proper application of the proviso will, at least in all cases where there is no substantial abnormality, produce the same results required by the primary obligation. A careful consideration of the requirements of the director general's primary obligation discloses not even the slightest reference to the annual expenditures of the carrier during the test period. It requires that the director general expend "*in payments for labor and materials, or by payments into funds, such sums for the maintenance, repair, renewal, retirement, and depreciation of the property described in paragraph (a) of Section 2 hereof as may be requisite in order that such property may be returned to the company at the end of federal control in substantially as good repair and in substantially as complete equipment as it was on January 1, 1918.*" (Italics ours.) The sole test under the primary obligation of the adequacy of the expenditures made by the director general is the physical condition of the property and its completeness of equipment at the beginning and at the end of federal control.

Necessarily an expenditure is involved in making physical reparation and in effecting the return of the property in substantially as good condition and in substantially as complete equipment as at the beginning of federal control. *The expenditure and payment into funds is the medium, but the physical condition of the property is the measure.* If the property was not in substantially as good repair and in substantially as complete equipment at the end as at the beginning of federal control this situation is met by a requirement of payment into funds to be delivered to the carrier of an amount necessary to enable the carrier to place such property in substantially as good repair and in substantially as complete equipment at the end as at the beginning of federal control. Therefore, any interpretation of the proviso to render it harmonious with the requirements of the primary obligation must give substantial and important effect to the physical reparation requirement.

The carriers say that the final test of the adequacy of expenditures as made by the director general under the proviso is whether or not the result was in each year of federal control "as nearly as practicable the same relative amount, character, and durability of physical reparation." This interpretation is in entire accord and harmony with the primary obligation. In the normal case, if consideration be given to the relative quantum and use of the property "the same relative amount, character, and durability of physical reparation" must result in returning the property to the carrier "in substantially as good repair and in substantially as complete equipment as it was on January 1, 1918." The "money test" is, by the terms of the contract, made subject to the requirement of physical reparation. The "money test," therefore, can be applied only where no physical reparation measure can be found. It must then be applied for the purpose and to the end of, so far as practicable, accomplishing physical reparation and not to the end and with the purpose of avoiding the making of physical reparation.

If the interpretation suggested in the director general's brief is to prevail there are two absolutely independent and inharmonious standards of settlement, of which the director general may avail himself, neither one of which has, so far as results required are concerned, any dependency upon, or any direct relation to, the other, because the unquestioned measure of the expenditures required under the primary obli-

gation is that they, together with the payment into funds, must accomplish a return to the carrier of its property in substantially as good repair and in substantially as complete equipment as when taken over. On the other hand, under the proviso as interpreted by the director general, all that is required is that a certain amount of expenditures shall be made and it is immaterial what, if any, physical reparation resulted therefrom.

Further as to Cost of Labor and Materials

One of the reasons urged by the director general as justifying his interpretation of the words "the cost of labor and materials," as the equivalent of the words, "the price of labor and materials," for which they were substituted, is that in the carriers' draft of standard clauses of March 22, 1918, there was a provision requiring that "in addition to the increase in the price of labor" allowance should be made for decrease in the efficiency of labor, and that this provision was rejected by him. It is true there was such a provision in the draft of March 22, 1918, submitted by the carriers, and that such provision was objected to by the director general. Following this objection and on April 4, 1918, the first government draft was presented to the carriers and the provision tendered in that draft in lieu of the provision objected to was as follows:

"In comparing the amount thus expended and reserved by the director general with the amount expended and reserved by the company during said period for three years, due allowance shall be made for any difference that may exist between the *price* of labor and materials and between the amount of property operated during the quarter year of federal control and the average for the said three years, *so that the comparison shall be reduced to a basis of relative physical reparation.*" (Italics ours.)

As a result of the negotiations this provision was modified and enlarged as it finally appeared as paragraph (*c*) of Section 5 of the standard clauses and is here reproduced for ready comparison:

"(*c*) In comparing the amounts expended and charged under the provisions of paragraphs (*a*) and (*b*) of this section with the amounts expended and charged during the test period, due allowance shall be made for any difference that may exist between the *cost* of labor and materials and between the amount of property taken over and the average for the test period, and, as to paragraph (*a*), for any difference in use between that of the test period and during federal control which in the opinion of the commission is substantial enough to be considered, so that the result shall be, *as nearly as practicable, the same relative amount, character, and durability of physical reparation.*"

It will be observed as a result of the negotiations and of the carriers' objections to the word "*price*" as coupled with the requirement "*so the comparison shall be reduced to a basis of relative physical reparation*" as wholly inadequate and as not properly measuring the director general's liability under the federal control act and the proclamation of the president, the word "*cost*" was substituted for the word "*price*" and the words "*so that the result shall be, as nearly as practicable, the same relative amount, character, and durability of physical reparation*" were substituted for the words "*so that the comparison shall be reduced to a basis of relative physical reparation.*" While in March, 1918, at the beginning of the negotiations the director general objected to the use of the words "efficiency of labor," before the conclusion of the negotiations he agreed to a substitution of the word "cost" for the word "price" (and not for grammatical purposes) and to the substitution of a definite requirement that the result of the adjustment to be made under paragraph (*c*) "shall be, as nearly as practicable, the same relative amount, character, and durability of physical reparation" instead of "so that the comparison shall be reduced to a basis of relative physical reparation."

The carriers respectfully insist that the substitution of the word "cost" for the word "price" and the use of the word "cost" in the connection and setting in which it is used necessarily requires that in making the adjustment provided for in paragraph (*c*) every factor enhancing cost must be included, because, among other things, the physical reparation result required cannot be accomplished unless the word "cost" is so interpreted.

Further Tests of the Director General's Interpretation

1. The director general may discharge his primary maintenance obligation by showing that the property of the carrier was returned to it in substantially as good repair and in substantially as complete equipment as when taken over. He has at all times reserved to himself this right. Suppose the director general elects to settle with the carrier under his primary obligation by returning its property in substantially as good repair and in substantially as complete equipment as when taken over. Who then bears the cost of the inefficiency of labor, and any and all other costs in excess of the amount produced by equating only the price of labor and materials? Can it be questioned that in such case every factor of cost of such return, whether resulting from inefficiency of labor or otherwise, must be borne by the director general? Can it be further said that if the director general elects to settle under the proviso that by that election he effectively shifts the responsibility to the carrier for inefficiency and other elements of labor costs not reflected in an equation based on prices only? If the director general settles under his primary obligation he undoubtedly is not only responsible for, but bears the burden of every element, including inefficiency of labor, entering into such cost. What is there to indicate that a different rule is intended where the settlement is under the proviso?

2. Suppose the director general elects to settle with one carrier under his primary obligation and with another carrier under the proviso, must the contract be so interpreted that while he is, under his primary obligation, unqualifiedly required to bear all the cost (including that of inefficiency of labor) of returning the property in substantially as good repair and in substantially as complete equipment as when taken over, that the carrier which he elects to settle with under the proviso must bear all other costs than those reflected by the bare equation of the price of labor and material? Is it reasonable to assume in the light of the language used in the agreement that it was contemplated such inequitable and discriminating results might be accomplished thereunder?

3. Let us make another test of the reasonableness of the interpretation contended for by the director general. A large majority of the additions and betterments projects are in connection with maintenance work; that is to say, the same employees while engaged at one and the same time in the construction of additions and betterments and maintenance work, the two classes of work going along concurrently. This was equally as true while the director general was in charge of the properties as prior thereto. His employees were engaged at the same time in additions and betterments and maintenance work. The carrier is required to pay to the director general the cost of additions and betterments made by him to its property, and the director general is to allow the carrier a rate of compensation on the cost of such additions and betterments. The cost to the carrier of such additions and betterments as computed by the director general and charged to the carrier includes not only the increase in the price of labor and materials, but every other element going to make for increased cost, including inefficiency of labor. Are the costs to the carrier of additions and betterments under the agreement to include the

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inefficiency of labor and other costs in addition to the increase in price of labor and materials, and the director general to be reimbursed therefor, and yet similar costs incurred by the director general in the maintenance of the property with the same employees and at the same time and on the same work to be treated, so far as such costs result from inefficiency of labor or causes other than increase in price of labor, so as to in effect charge to the carrier, rather than to the director general, all of such maintenance expenses which result from such inefficiency of labor or causes other than increase in price of labor?

4. It is provided in paragraph (*b*) of Section 8 that no claim shall be made by the carrier against the director general on the ground that the actual "cost" of additions and betterments at the time of construction was greater than under other market or commercial conditions; in other words, the carrier must be charged with the actual cost of such additions and betterments, including that resulting from the inefficiency of labor, or causes other than increase in the price of labor. Is the meaning of the word "cost" as used in paragraph (*c*) of Section 5 different from its meaning where used in paragraph (*b*) of Section 8?

5. Under paragraph (*e*) of Section 5 if the property of the carrier in possession of the director general is destroyed otherwise than by fire or public enemies and not restored or replaced, he must reimburse the carrier the cost of the restoration or replacement or the value of the property is to be charged to railway operating expenses. Does the word "cost" as here used mean the same thing as the word "cost" as used in paragraph (*c*) of Section 5? If so, under the carriers' interpretation the director general would be entitled to charge the entire cost of the restoration or replacement to operating expenses, but under the director general's contention all costs and elements of cost other than those based on price increases, including inefficiency of labor, would have to be borne by the director general and not charged against the carrier.

6. Many carriers prior to federal control used a piece-work basis for compensation of shop and some of their other employees. Many other carriers had bonus systems based upon piece-work studies, and yet other carriers had other bases for securing a day's work for a day's pay. The ten hour day generally prevailed among maintenance employees, and particularly roadway and track maintenance men. The bases above referred to and other similar bases were discarded by the director general and a basic eight hour day adopted, and a flat rate per day or per hour of compensation, with overtime pay, in many cases punitive, was substituted. Maintenance of way employees prior to federal control went to and from their employment on their own time. Under article 10 of supplement No. 8 to General Order 27 dated September 1, 1918, and effective that date, section men were assembled and went to and from a designated point on the company's time. The result of the establishment of a standard eight hour day reduced the actual working hours of the section men from ten to eight hours, and their traveling from a designated point to and from their work on the company's time reduced the actual working time approximately another hour, with the result that the actual working day of the section men was reduced from 10 to 7 hours. Under item 4 of supplement No. 7 of General Order 27, effective September 1, 1919, article 11-B it is provided:

"When employees are notified or called to work outside of the established hours they will be paid a minimum allowance of three hours."

From October 20, 1919, under rule 60 of the national agreement with railroad shop employees, one hour extra allowance was made to each employee each week regardless of the number of hours worked during the week where the employee was required to check in and out on his own time. This had particular reference to shop men. These are mere illustrations of the effect on the cost to accomplish a particular unit of physical reparation resulting from the director general's orders and as demonstrating the unfairness of limiting the adjustment required by paragraph (*c*) of Section 5 to the wage or price of labor.

In addition thereto a large percentage of the skilled mechanics in the employ of the railroad companies were either called into military service by the government, which was operating through the director general the properties of the carriers, or were attracted by higher wages paid by war industries at the instance of the government, to enter manufacturing pursuits. As a result of the change of the bases of pay and other changes made by the director general and the resulting decline in morale and the loss of skilled employees, it is a public fact, so well known that judicial knowledge might well be taken thereof, that the actual number of hours of labor required to accomplish a unit of physical reparation was in practically every case greater during federal control than during the test period, and consequently the actual cost of accomplishing any given amount of physical reparation far exceeded the mere increase in the price of materials and price of labor per day or per hour paid for maintenance work. The director general was in possession and control of the properties of the carriers and determined the amount of wages to be paid, the basis on which the same should be paid, and extra allowances that might be made in the form of punitive overtime, free time and otherwise, and it is just that he should be charged with the results of his own management in the maintenance of the properties of the carriers. It is manifestly unjust, in the light of the power and authority exercised by him, to say in effect the carrier must be responsible for all costs of the director general's maintenance, other than that resulting from an application of increase in the price of labor and material, and that this was what the carrier sought to do and it is what they believe they did by incorporation of paragraph (*c*) of Section 5 in the maintenance obligation of the director general.

7. Would it not follow under the director general's interpretation, that if a carrier inserting 100,000 first class ties on an average during the test period and these ties cost $1 each, the director general could comply with his obligation as to the replacement of ties by inserting 100,000 second-grade or culled ties if such ties cost him $1 each? It is the carriers' contention that it is the director general's obligation in restoring physical units to restore units of the same relative character and durability as those installed by the carrier during the test period, and that it is his duty to bear the entire cost of the purchase and installation of such units. The adjustment required by paragraph (*c*) of Section 5 is mandatory and is applicable to all expenditures and charges mentioned or referred to in the proviso to paragraph 5-(*a*).

THE SAFETY ASSOCIATION OF SOUTHEASTERN RAILROADS has an exhibit at the North Carolina State Fair at Raleigh which directs attention toward the carelessness of automobile drivers in crossing railway tracks. The main feature of the exhibit is a large painting showing a train approaching a railway crossing and a carelessly driven automobile, filled with people in a race with the train for priority at the crossing. Other smaller paintings show many ways in which crossing accidents occur and all these are taken from actual accidents which have occurred in the South in the last few months. It is estimated that more than 100,000 persons visited the exhibit and the safety departments of the railways are hoping for some tangible results in the way of decreased accidents.

General News Department

Two passenger trains of the Norfolk & Western collided on a siding at Rural Retreat, Va., on October 20, resulting in the death of three trainmen and injuries to five passengers.

Fire which destroyed the freight house of the Chicago Junction, at Forty-third street and Robey street, Chicago, on October 13, is estimated to have caused an approximate damage of $750,000. Quantities of merchandise were burned and 94 freight cars, most of them loaded, were destroyed by the fire.

The railways have ordered 440,000 tons of rails for delivery next year from the United States Steel Corporation. The production has been distributed as follows: 300,000 tons to mills in the Chicago district; 80,000 tons to the Carnegie Steel Company, and 60,000 tons to the Tennessee Coal & Iron Company.

Seven persons were killed and 20 injured when an eastbound passenger train on the New York Central sideswiped a westbound passenger train at Erie, Pa., on October 20. The statement was made at the general offices of the company that the accident was due to the failure of a signalman to throw the switches properly.

Valuations for tax assessment of railroad property in the state of Tennessee, as reported by the Railroad and Public Utilities Commission of the state, aggregate for the present year $188,607,000; and the total valuation for all railroad and public utilities' property, as reported by the Commission, is more than twice the aggregate reported two years ago; the total this year being $273,943,202 as against $132,447,120 for the preceding biennial period.

A "no-accident" campaign has been started on the Baltimore & Ohio and will end November 16. During the campaign every effort is to be exerted to prevent injury to employees and patrons of the road. The various divisions will be in competition against each other and the division which makes the greatest improvement in the number of accidents over the same period last year will be awarded a pennant, to be displayed at division headquarters.

Prizes aggregating $4,600 were awarded this week by the Pennsylvania, Eastern region, to supervisors and assistants whose sections of track were in the best condition. The awards were based upon the decision of a committee of officers who inspect the lines each month in a car equipped with devices for recording all horizontal and lateral motion. After allowance is made for speed an accurate judgment of the riding qualities of various sections of track is arrived at from these records.

The Interstate Commerce Commission has addressed a questionnaire to the railroads, Special Report Series Circular No. 29, for the purpose of procuring information, as of the beginning of the effective date of Section 20a of the interstate commerce act, authorizing it to supervise the issuance of securities, concerning securities, as that term is defined in the act, nominally or actually issued or outstanding, as well as information concerning the assumption by a carrier of obligations or liabilities as lessor, lessee, guarantor, endorser, surety or otherwise, in respect of the securities of any other person, natural or artificial.

Railway Club of Pittsburgh

The annual meeting and election of officers of the Railway Club of Pittsburgh will be held at the Americus Club House, 211 Smithfield street, Pittsburgh, Pa., on October 28, at 8:00 p. m. An entertainment has been provided to follow the meeting.

A New Commission in New Jersey

New Jersey will have a new commission of public utilities as the result of the action of Governor Edwards in dismissing all the members of that body and appointing new men to take their places. This step was taken by the governor after a hearing, the verdict of which was in part that the officials were guilty of neglect of duty and misconduct in office in that they discriminated in favor of the Public Service Corporation against smaller and less influential concerns and that they knowingly employed as rate and valuation experts men who were clearly biased toward the corporation. The discharged members announce their intention to remain in office until an appeal to the courts can be had to determine the validity of Governor Edwards' action.

The Creeping of Rails

A paper entitled "The Creeping of Railroad Rails," prepared by Dr. J. A. L. Waddell, 35 Nassau street, New York, will be published soon by the American Society of Civil Engineers. This paper will contain the information secured in reply to a questionnaire submitted to over one hundred of the leading authorities on this subject in North America. In view of the recently established practice of the society to send advance copies of papers only to those particularly interested, this paper will not receive general distribution at present. As it is desired to secure a thorough discussion of this important subject, those interested can secure copies on application to the author.

Freight Claim Prevention Congress

President R. H. Aishton of the American Railway Association has announced that there will be held at the Hotel La Salle, Chicago, on November 15 and 16 a Freight Claim Prevention Congress under the auspices of the committee on cause and prevention of Division VII—Freight Claims—of the American Railway Association.

The objects of the congress will be:

1. The promotion of claim prevention efforts on inactive lines.
2. The increase of effectiveness of active lines.
3. The co-ordination of efforts of individual lines into a general claim prevention movement.

It is desired that there be in attendance at this congress the officers of member lines having jurisdiction over established freight claim prevention organizations, as well as the representatives of lines not so organized, and the management of each member is urged to have one or more representatives of his railroad in attendance.

The docket of the congress will be as follows:

1. Promotion of claim prevention efforts on inactive lines:
   - (a) Duty to the shipping public,
   - (b) Duty of carriers to themselves and to each other,
   - (c) Economic waste in the country's products,
   - (d) Financial loss.
2. Increase of effectiveness of active lines:
   - (a) Effectiveness of existing organizations,
   - (b) Departmental co-ordination.
   - (c) Co-operation of employees.
3. Co-ordination of efforts of individual lines into a general claim prevention movement:
   - (a) Exchange of information and establishment of practices between interested lines to correct conditions creating claims.
   - (b) Co-operation of weighing and inspection bureaus and other organizations in a position to assist in prevention of claims.
   - (c) Means of utilizing committee on cause and prevention of the freight claim division for exchange of information and co-ordination of claim prevention activities.

In connection with this announcement Mr. Aishton has also advised member roads to the effect that the organization of the Committee on Cause and Prevention of Freight Claims has now been perfected and that correspondence concerning its activities should be addressed to Lewis Pilcher, secretary of the Freight Claim Division, A. R. A., 431 South Dearborn street, Chicago.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF AUGUST, 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$190,291	$91,517	$305,025	$120,430	$86,853	$11,975	$164,598	$18,055	$405,688	133.%	—$100,663	$14,639	—$115,302	—$155,925
Ann Arbor	294	399,338	84,692	510,273	153,154	132,176	8,950	281,393	17,166	592,905	116.193	—82,632	17,500	—100,132	—203,748
Atchison, Topeka & Santa Fe	8,829	13,243,204	4,870,100	19,892,620	6,518,555	3,806,026	348,993	9,696,215	565,269	20,720,546	104.161	—827,925	940.501	—1,781,727	—6,382,652
Atlanta & West Point	93	134,451	123,040	288,878	48,298	51,088	2,222	85,871	7,756	199,339	69.004	89,540	8,928	80,612	27,301
Atlanta, Birmingham & Atlantic	640	332,266	126,613	493,243	178,700	239,238	29,452	385,160	28,075	860,710	174.50	—367,467	16,074	—383,642	—506,645
Atlantic City	177	177,399	648,973	851,275	121,858	77,546	4,172	421,248	1,269	625,879	73.522	225,395	19,501	205,892	—121,589
Atlantic Coast Line	4,890	3,784,494	1,521,417	5,772,347	2,143,094	1,606,960	83,565	2,778,799	152,630	6,790,475	117.638	—1,318,128	300,000	—1,318,670	—1,274,708
Atlantic & St. Lawrence	166	182,853	62,772	265,758	125,237	101,439	3,803	227,886	21,815	482,375	181.622	—216,617	17,722	—234,340	—163,816
Baltimore & Ohio Chicago Terminal	91	.....	.....	160,553	—34,816	58,772	2,076	209,000	14,901	256,788	159.94	—96,234	31,169	—127,403	—97,511
Baltimore & Ohio (estimated for August)	5,154	15,453,377	3,163,441	20,222,080	3,070,000	6,608,000	253,000	10,500,000	590,000	21,163,000	104.66	—940,920	714,793	—1,657,221	—4,234,510
Baltimore, Chesapeake & Atlantic	88	111,615	98,498	221,861	42,600	35,565	2,936	139,720	5,658	276,479	124.618	—4,618	3,700	—8,318	101,787
Bangor & Aroostook	659	300,231	96,614	424,734	116,441	143,301	4,842	203,774	26,026	501,623	118.103	—76,890	17,841	—94,731	56,789
Belt Railway of Chicago	31	.....	.....	415,063	94,772	119,607	1,533	394,297	12,750	622,959	150.09	—207,896	24,767	—232,663	—324,715
Bessemer & Lake Erie	225	1,556,850	61,175	1,652,351	161,735	496,453	19,821	695,450	39,315	1,425,151	86.25	227,201	15,800	211,398	—322,309
Bingham & Garfield	37	176,357	1,835	181,281	47,690	41,341	1,953	38,608	5,621	135,405	74.693	45,876	10,459	35,417	65,461
Birmingham Southern	31	38,138	.....	53,397	4,162	11,000	1,015	32,555	3,739	52,471	98.266	926	1,754	—828	—2,229
Boston & Maine	2,305	4,702,387	2,701,036	8,206,354	2,378,572	2,915,980	52,657	6,113,164	349,024	11,862,949	144.558	—3,656,596	254,073	—3,910,709	—5,368,341
Brooklyn Eastern District Terminal	9	105,320	.....	116,979	1,551	34,951	.....	111,463	5,794	153,760	131.443	—36,781	6,194	—42,975	—43,481
Buffalo & Susquehanna R.R. Corp.	297	241,370	7,402	253,020	97,131	178,102	4,575	137,796	14,431	432,036	170.752	—179,016	11,200	—190,216	—188,607
Buffalo, Rochester & Pittsburgh	590	1,636,064	199,762	1,917,482	462,399	546,158	28,265	1,047,105	49,404	2,133,085	111.244	—215,603	35,000	—250,604	—345,411
Canadian Pacific (Lines in Maine)	234	132,203	41,481	189,632	65,104	44,790	3,356	101,281	3,695	218,226	115.080	—28,594	12,200	—40,794	—20,681
Carolina, Clinchfield & Ohio	291	530,065	60,039	601,018	106,349	165,099	22,423	215,782	19,851	529,294	88.066	71,724	35,000	36,388	—121,234
Central New England (partly estimated)	361	702,691	31,275	758,536	216,529	120,369	4,705	349,479	15,630	706,689	93.164	51,846	18,225	32,269	17,626
Central of Georgia (estimated)	1,924	1,296,394	685,276	2,193,148	612,200	1,066,500	60,000	1,225,950	91,000	3,060,000	139.532	—866,852	101,332	—968,184	—1,266,151
Central R.R. of New Jersey	686	3,465,489	1,255,775	5,038,246	1,977,048	3,257,557	60,732	3,642,344	193,440	9,176,229	182.131	—4,137,984	295,337	—4,433,321	—4,995,813
Central Vermont	414	442,597	144,383	643,451	168,345	243,095	18,201	538,002	31,020	1,000,675	155.53	—357,224	17,400	—374,916	—296,106
Charleston & West Carolina	342	255,839	73,592	345,481	149,823	92,348	7,976	233,903	5,663	489,714	141.748	—144,233	11,625	—155,858	—171,796
Chesapeake & Ohio	2,520	5,816,601	1,218,767	7,615,757	1,696,917	2,572,027	79,932	4,145,117	178,758	8,720,244	114.502	—1,104,488	349,810	—1,454,365	—2,497,251
Chicago & Alton	1,050	1,691,112	719,576	2,618,421	542,974	894,366	50,073	1,446,199	68,426	3,028,622	115.666	—410,200	67,500	—477,752	—557,595
Chicago & Eastern Illinois	1,130	2,006,500	534,545	2,778,704	645,635	971,465	52,073	1,279,563	72,253	3,039,810	109.396	—261,106	100,000	—361,295	—742,625
Chicago, Det. & Canada Grand Trk. Jct.	62	157,649	26,902	211,964	23,053	31,898	2,774	101,771	4,495	164,095	77.416	47,868	4,596	43,272	—87,235
Chicago & Erie	269	1,041,799	96,446	1,243,878	197,828	224,742	20,660	723,118	49,023	1,218,107	97.928	25,771	40,909	—15,231	—219,449
Chicago & North Western (preliminary)	8,405	10,009,475	3,773,993	15,332,177	4,561,761	5,448,186	164,018	9,863,182	514,330	20,686,752	134.923	—5,354,575	725,000	—6,079,674	—7,697,650
Chicago, Burlington & Quincy	9,371	10,303,089	3,834,128	15,509,311	3,991,418	4,894,232	177,652	9,571,751	582,275	19,393,871	125.05	—3,884,559	658,825	—4,542,994	—8,843,934
Chicago, Indianapolis & Louisville	654	1,068,607	317,359	1,528,562	390,037	602,708	54,107	995,538	43,678	2,104,936	157.71	—576,374	44,907	—621,284	—852,083
Chicago Junction	12	.....	.....	324,546	70,665	74,359	135	357,917	11,665	514,740	159.527	—190,194	3,215	—193,409	—238,246
Chicago, Milwaukee & St. Paul	10,629	9,126,064	3,109,923	13,835,365	4,514,329	5,298,129	190,848	10,255,769	719,470	21,153,524	152.894	—7,318,159	677,263	—7,996,559	—9,259,768
Chicago, Peoria & St. Louis	247	229,163	37,244	285,912	71,374	123,800	6,168	194,066	21,109	416,516	145.681	—130,603	7,100	—137,703	—77,737
Chicago, Rock Island & Gulf	461	344,863	137,993	497,999	136,475	132,295	13,149	313,410	21,007	617,780	124.052	—119,781	12,833	—132,619	—210,392
Chicago, Rock Island & Pacific	7,663	8,224,578	3,617,133	12,634,768	2,772,908	3,281,283	198,418	6,067,968	288,604	12,508,317	101.01	126,451	460,070	—333,713	—2,358,670
Chicago, S. Paul, Minn. & Omaha	1,749	1,790,148	191,255	2,809,728	1,126,674	807,993	37,975	1,824,697	114,463	3,929,490	139.853	—1,119,763	117,153	—1,238,144	—1,493,284
Chicago, Terre Haute & South Eastern	374	447,100	29,496	489,977	101,316	203,660	4,942	215,994	9,458	537,288	109.655	—47,311	19,500	—66,811	—97,324
Cincinnati, Indianapolis & Western	321	307,395	79,781	409,210	142,836	182,200	13,416	270,702	31,256	642,617	157.038	—233,006	13,539	—246,545	—271,267
Cincinnati, Lebanon & Northern	76	116,005	12,590	100,455	16,080	30,977	2,583	121,530	4,356	175,527	174.73	—75,071	6,810	—81,881	2,406
Cincinnati Northern	245	307,048	27,305	346,364	52,532	65,245	5,063	128,030	9,251	260,121	75.100	86,243	10,988	75,228	8,677
Cleveland, Cincinnati, Chic. & St. Louis	2,408	5,193,232	2,038,373	7,927,822	1,261,869	1,973,877	115,122	3,577,229	158,557	7,160,204	90.317	767,619	328,775	438,735	—1,700,404
Copper Range	142	73,158	11,481	97,454	23,765	12,641	1,788	39,997	2,184	80,375	82.475	17,078	6,824	10,254	29,914
Colorado & Southern (preliminary)	1,099	873,117	393,315	1,366,731	513,439	472,342	16,431	650,697	73,662	1,742,000	127.458	—375,269	59,791	—435,108	—626,502
Colorado & Wyoming	43	26,055	1,042	87,041	18,609	25,864	231	49,841	4,546	99,091	113.845	—12,050	5,000	—17,050	—29,932
Delaware & Hudson	881	3,580,438	470,826	4,314,320	590,024	1,066,880	36,950	2,086,008	179,377	3,994,381	99.584	319,939	81,500	238,420	—421,850
Delaware, Lackawanna & Western	956	5,459,749	1,412,065	7,610,274	1,599,754	2,174,835	114,020	4,702,202	218,964	8,911,781	117.101	—1,301,507	489,583	—1,791,118	—2,934,507
Denver & Rio Grande	2,585	2,531,763	889,900	3,703,738	1,057,726	1,186,090	59,289	1,764,442	115,902	4,294,812	115.958	—591,073	135,000	—726.180	—1,517,396
Denver & Salt Lake	255	208,349	80,190	300,691	106,681	42,480	3,294	129,825	7,277	289,557	96.297	11,134	9,000	2,125	1,210
Detroit & Mackinac	376	134,042	46,469	192,500	46,990	51,225	2,942	108,316	10,804	220,133	114.355	—27,633	10,809	—38,541	—65,148
Detroit, Grand Haven & Milwaukee	195	364,571	75,748	492,218	115,474	107,264	11,071	315,456	17,817	568,025	115.401	—75.808	3.088	—78,897	—202,028
Detroit, Toledo & Ironton	455	556,631	19,611	399,142	312,328	145,425	9,847	327,966	25,309	820,723	205.62	—421,581	9,061	—431,040	—432,875
Duluth & Iron Range	298	1,476,686	26,672	1,626,113	166,429	144,807	1,633	348,031	25,854	687,431	42.274	938,682	82,919	855,763	272,465
Duluth, Missabe & Northern	406	2,628,653	56,676	2,925,770	263,559	180,774	3,892	526,362	24,133	1,000,688	34.202	1,925,082	149,611	1,775,471	676,917
Duluth, South Shore & Atlantic	613	383,240	155,213	585,514	180,467	105,727	6,487	338,720	18,352	659,128	112.632	—73,614	25,000	—98,629	—147,085
Duluth, Winnipeg & Pacific	178	163,168	31,160	198,927	57,042	39,181	4,173	99,119	9,604	209,119	105.123	—10,192	9,111	—19,303	—35,592
East St. Louis Connecting	3	.....	.....	140,228	20,665	47,909	442	161,286	5,537	235,840	168.183	—95,612	328	—95,940	—101,636
El Paso & South Western	1,027	897,690	151,241	1,128,710	734,364	404,560	25,134	450,423	58,479	1,683,607	149.162	—554,897	100,415	—655,321	—881,975
Elgin, Joliet & Eastern	835	1,916,261	5	2,129,101	378,616	657,785	12,436	1,253,276	53,736	2,354,605	110.591	—225,504	51,600	—277,104	—547,578
Erie	1,989	7,175,952	1,500,075	9,504,131	2,123,897	4,448,538	124,744	6,696,360	430,153	13,906,236	146.317	—4,402,115	250,503	—4,653,687	—5,902,888
Florida East Coast	764	480,006	227,320	841,158	269,637	295,865	11,121	523,360	35,323	1,444,445	136.057	—303,287	49,196	—352,488	—432,665
Fonda, Johnstown & Gloversville	88	44,933	84,547	134,162	14,629	13,676	784	60,366	—16,204	73,252	54.60	60,910	5,075	55,835	3,387
Fort Smith & Western	253	105,750	45,968	166,184	34,750	39,750	4,538	65,072	7,943	153,390	92.301	12,794	5,000	7,794	—8,487
Fort Worth & Denver City	454	661,790	457,122	1,180,374	253,699	356,946	11,702	663,608	54,107	1,352,777	114.61	—172,403	24,513	—196,957	—555,522
Georgia	328	327,328	187,685	550,740	181,885	136,614	23,860	357,046	21,168	720,791	130.877	—170,051	5,950	—176,002	—224,075
Georgia & Florida	405	86,906	35,805	132,574	96,962	43,845	8,719	107,832	13,242	270,600	204.113	—138,025	6,591	—144,619	—113,728

REVENUES AND EXPENSES OF RAILWAYS

EIGHT MONTHS OF CALENDAR YEAR 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$1,379,678	$567,956	$2,149,422	$416,318	$439,042	$49,327	$835,488	$87,493	$1,852,657	86.193	$296,765	$110,978	$185,708	$81,649
Ann Arbor	300	2,621,897	468,302	3,328,615	533,455	736,738	57,562	1,641,134	119,033	3,088,185	92.794	240,430	138,400	101,967	—199,102
Atchison, Topeka & Santa Fe	8,735	88,902,532	34,544,559	137,445,643	23,673,229	31,157,192	1,622,938	50,361,541	2,651,432	109,215,533	80.702	28,230,110	6,938,152	21,272,583	207,250
Atlanta & West Point	93	999,847	745,881	2,009,167	275,370	355,945	46,753	751,726	76,055	1,538,378	76.568	470,789	65,510	405,278	14,560
Atlanta, Birmingham & Atlantic	640	2,761,278	677,440	3,792,603	930,203	1,173,921	158,192	2,106,669	155,782	4,525,363	119.320	—732,760	130,764	—864,671	—146,301
Atlantic City	177	915,045	2,309,097	3,387,668	471,644	377,580	21,048	1,787,800	12,052	2,670,599	78.832	717,068	118,203	598,842	—262,152
Atlantic Coast Line	4,891	31,505,467	12,411,728	48,408,882	8,566,011	10,608,528	584,021	22,819,435	1,089,968	43,980,695	90.852	4,428,188	2,200,000	2,218,776	—2,466,262
Atlantic & St. Lawrence	166	1,419,670	313,461	1,873,237	567,210	523,634	23,023	1,300,098	105,656	2,528,069	134.957	—654,832	128,628	—783,515	—204,213
Baltimore & Chicago Terminal	91	.....	.....	1,316,168	296,915	459,226	10,312	1,172,716	89,538	2,069,092	157.221	—752,924	240,098	—993,028	—273,128
Baltimore & Ohio (estimated)	5,153	107,714,904	19,385,023	139,081,224	20,990,162	44,165,700	1,739,764	68,925,605	3,930,192	140,785,662	101.225	—1,704,438	4,578,791	—6,315,098	—7,671,041
Baltimore, Chesapeake & Atlanta	88	618,868	335,610	1,027,994	119,893	378,583	10,783	674,159	32,109	1,215,526	118.242	—187,533	29,600	—217,133	143,791
Bangor & Aroostook	659	3,114,065	667,916	4,074,026	964,452	1,010,192	32,768	1,642,448	152,959	3,863,285	94.827	210,741	201,455	9,284	—15,481
Beaumont, Sour Lake & Western	119	1,064,472	249,763	1,379,663	339,533	205,601	25,953	512,597	47,994	1,131,158	81,988	248,506	21,800	226,687	211,452
Bessemer & Lake Erie	225	7,606,995	329,131	8,183,636	1,005,186	2,767,955	112,855	3,015,147	238,473	7,197,607	87.951	986,029	122,600	863,401	—1,206,803
Bingham & Garfield	37	1,229,223	13,440	1,261,653	274,018	293,581	14,108	283,301	36,732	908,814	72.033	352,838	62,434	290,398	489,650
Birmingham Southern	31	285,526	.....	396,666	35,744	66,071	7,891	242,762	28,443	380,910	96.030	15,756	4,033	1,693	—74,418
Belt Railway of Chicago	31	.....	.....	2,658,060	372,672	539,125	5,821	1,797,518	68,813	2,783,949	104.74	—125,889	181,307	—307,196	—408,117
Boston & Maine	2,293	32,556,636	15,539,874	54,117,657	9,465,417	12,990,987	367,586	32,695,402	1,872,779	57,676,005	106.575	—3,558,348	1,892,434	—5,498,501	—7,913,454
Brooklyn Eastern District Terminal	9	643,430	.....	712,646	123,191	249,321	1,235	511,304	35,606	920,658	129.188	—208,012	49,787	—257,798	—7,625
Buffalo & Susquehanna R. R. Corp.	297	1,748,140	55,554	1,840,899	448,313	867,279	20,467	723,035	83,758	2,142,852	116.402	—301.953	50,100	—352,054	—161,896
Buffalo, Rochester & Pittsburgh	590	10,845,109	1,192,425	12,562,751	2,306,313	4,460,669	139,220	6,212,477	330,307	13,463,544	107.170	—900,793	260,000	—1,161,447	—395,405
Canadian Pacific (Lines in Maine)	234	1,401,243	416,513	1,917,363	443,358	483,014	24,423	1,222,085	28,425	2,201,305	114.809	—283,942	97,600	—381,542	—83,640
Carolina, Clinchfield & Ohio	291	4,176,378	333,711	4,639,462	640,575	1,117,302	118,592	1,478,738	155,092	3,508,587	75.624	1,130,876	†252,523	877,747	3,017
Central Vermont	414	3,106,000	780,461	4,358,279	775,591	1,330,670	81,189	3,123,583	163,719	5,492,050	137.49	—1,133,771	139,200	1,273,331	—594,582
Central New England (partly estimated)	301	3,875,854	201,315	4,295,600	1,376,645	1,129,615	27,600	2,743,954	131,256	5,414,682	126.051	—1,119,082	143,838	—1,264,330	—1,382,122
Central of Georgia (estimated)	1,924	10,271,723	4,436,312	16,721,920	3,248,010	4,309,671	392,704	7,918,616	617,824	16,524,580	98.819	197,340	653,821	—456,845	—1,661,252
Central R. R. of New Jersey	686	22,054,602	6,421,898	30,912,382	5,039,366	11,139,165	249,771	17,205,498	841,294	34,698,112	112.246	—3,785,729	2,154,380	—5,940,241	—8,226,078
Charleston & Western Carolina	342	1,770,713	440,959	2,342,068	571,245	522,890	42,930	1,306,161	40,859	2,484,084	106.099	—142,016	86,750	—228,887	—347,262
Chesapeake & Ohio	2,518	42,269,839	7,244,143	53,761,378	8,308,117	15,694,702	458,664	23,505,157	1,170,610	49,401,763	91.890	4,359,614	1,998,480	2,359,960	—5,866,351
Chicago, Burlington & Quincy	9,371	77,898,445	23,305,967	114,147,989	21,744,985	26,029,201	1,067,676	52,489,515	3,232,743	105,854,211	92.73	8,293,778	5,395,445	—2,881,388	—14,012,352
Chicago, Indianapolis & Louisville	654	6,675,019	2,110,215	9,888,558	1,414,852	3,189,011	228,233	4,701,114	255,510	9,913,272	100.25	—24,714	381,825	—406,879	—1,448,578
Chicago, Rock Island & Pacific	7,631	56,733,295	22,020,998	86,653,601	17,162,764	22,810,867	1,037,529	40,297,097	2,048,353	83,590,894	96.47	3,062,707	3,529,872	—472,665	—7,039,989
Chicago & Alton	1,050	12,362,961	4,409,263	18,588,141	2,975,046	5,249,129	283,798	8,894,967	502,117	18,016,235	96.923	571,906	‡533,445	37,243	—895,839
Chicago & Eastern Illinois	1,131	12,876,160	3,437,291	18,582,889	2,775,199	6,335,119	210,775	8,452,448	523,909	18,403,674	99.035	179,215	770,000	—593,543	—180,472
Chicago, Detroit & Can. Grand Trk. Jct.	62	815,397	155,705	1,152,651	144,897	219,506	12,896	633,593	29,877	1,040,869	90.302	111,782	35,724	76,037	—466,139
Chicago & Erie	269	6,464,507	586,565	7,810,403	957,361	1,427,213	119,481	4,204,957	259,489	6,994,262	89.550	816,141	326,363	494,279	—257,760
Chicago & Northwestern	8,249	66,345,717	24,294,434	102,273,012	18,812,132	25,106,995	851,722	51,557,947	2,665,525	99,936,147	97.715	2,336,865	5,475,621	—3,144,187	—12,078,189
Chicago Junction	12	.....	.....	2,105,128	435,983	501,316	1,930	2,311,409	78,327	3,328,964	158.136	—1,223,836	25,343	—1,249,179	—795,371
Chicago, Milwaukee & St. Paul	10,628	71,309,207	20,264,644	104,920,356	19,850,485	27,469,245	972,286	53,524,318	3,417,843	106,002,424	101.030	—1,082,069	5,269,313	—6,385,126	—7,612,000
Chicago, Peoria & St. L.	247	1,356,361	221,375	1,697,065	325,265	594,476	32,984	901,798	88,617	1,943,071	114.496	—246,006	54,800	—300,821	283,502
Chicago, Rock Island & Gulf	461	3,019,154	833,867	4,215,819	691,487	696,469	70,423	1,797,646	112,761	3,378,555	80.139	837,264	125,034	712,039	466,935
Chicago, St. Paul, Minn. & Omaha	1,749	12,890,145	5,394,549	20,123,898	3,531,910	4,012,973	210,483	9,760,539	626,041	18,256,071	90.718	1,867,807	1,027,991	834,575	—896,308
Chicago, Terre Haute & Southeastern	374	3,121,042	197,757	3,417,407	555,359	1,266,223	37,531	1,523,356	89,740	3,485,796	102.001	—68,390	153,000	—221,390	—37,409
Cincinnati, Lebanon & Northern	76	629,263	72,782	764,546	161,708	181,379	14,694	560,776	20,183	938,739	122.78	—174,193	49,608	—223,803	179,664
Cincinnati, Indiana & Western	321	2,122,455	462,231	2,837,963	534,487	1,054,196	68,640	1,383,368	152,321	3,202,044	112,829	—364,081	105,334	—469,421	—177,990
Cincinnati Northern	248	1,929,425	164,447	2,205,184	424,093	504,490	28,694	850,887	49,305	1,858,447	84.276	346,737	82,797	263,905	—119,486
Cleveland, Cincinnati, Chicago & St. L.	2,408	37,220,320	12,599,635	55,778,106	7,590,770	13,158,729	779,401	24,065,788	1,139,543	47,180,897	84.586	8,597,208	1,861,579	6,731,360	—2,106,380
Colorado & Southern	1,099	6,607,269	1,932,518	9,357,557	1,951,478	2,490,467	93,420	3,497,323	369,503	8,480,951	90.632	876,607	460,728	413,877	—748,593
Colorado & Wyoming	43	166,189	7,508	627,867	115,400	153,620	2,272	333,403	33,347	638,041	101.621	—10,173	40,333	—50,173	—165,014
Copper Range	142	449,080	95,815	588,854	176,035	131,272	15,127	297,293	22,121	641,648	108.965	—52,794	51,345	—104,139	—43,750
Delaware & Hudson	881	22,618,246	2,299,259	26,485,248	3,193,978	7,912,234	229,855	13,628,818	1,160,228	26,330,329	99.415	154,919	644,142	—489,687	—2,211,764
Delaware, Lackawanna & Western	956	33,018,470	8,563,712	47,812,081	6,551,108	11,749,926	646,081	24,879,803	1,194,128	45,738,166	95.662	2,073,915	3,012,500	—939,789	—9,098,422
Denver & Rio Grande	2,585	17,086,137	4,895,484	23,975,497	4,054,265	6,070,011	308,411	8,978,228	651,394	20,578,601	85.832	3,396,896	1,032,000	2,349,406	—592,121
Denver & Salt Lake	255	1,325,458	315,788	1,731,856	592,681	585,051	9,193	972,295	63,936	2,223,157	128.368	—491,300	78,332	—569,712	50,809
Detroit, Toledo & Ironton	455	2,745,608	120,535	3,068,362	963,921	742,812	50,530	1,702,360	172,992	3,630,449	118.32	—562,087	71,214	—634,535	—204,206
Detroit & Mackinac	376	847,549	290,535	1,254,783	243,062	355,207	21,265	643,856	61,347	1,323,839	105.501	—69,057	105,535	—174,690	—88,004
Detroit, Grand Haven & Milwaukee	195	2,160,512	369,248	2,912,855	525,080	674,895	49,102	1,949,665	105,893	3,306,625	113.518	—393,770	26,113	—420,247	—827,094
Duluth & Iron Range	298	6,236,696	187,992	6,963,791	932,946	940,492	7,969	1,733,801	147,812	3,767,924	54.107	3,195,867	361,607	2,833,712	354,020
Duluth, Missabe & Northern	406	10,735,258	406,209	12,200,692	1,597,971	1,253,115	23,154	2,592,810	171,777	5,653,318	46.336	6,547,374	633,093	5,914,247	—2,263,345
Duluth, South Shore & Atlantic	613	2,318,289	856,933	3,584,915	798,326	658,962	42,109	1,829,633	93,947	3,474,199	96.911	110,716	191,000	—80,544	—139,133
Duluth, Winnipeg & Pacific	178	1,311,903	220,276	1,569,233	290,462	312,405	28,377	571,999	69,854	1,453,102	92.600	116,130	82,647	33,423	—23,966
East St. Louis Connecting	3	.....	.....	862,425	115,474	252,017	2,389	724,720	31,623	1,126,224	146.360	—263,798	18,393	—282,191	—203,845
El Paso & Southwestern	1,027	6,920,111	1,698,352	9,262,779	2,131,007	1,904,809	131,851	2,659,495	333,845	7,233,968	78.097	2,028,811	723,319	1,304,861	—827,354
Elgin, Joliet & Eastern	833	10,041,490	78	11,350,441	1,386,244	2,898,822	48,579	4,930,638	240,869	9,501,224	83.708	1,849,217	297,298	1,551,511	—1,519,950
Erie	1,989	49,077,042	9,074,406	64,951,849	10,353,530	23,941,742	775,036	36,790,077	2,101,910	74,523,060	114.735	—9,571,211	1,979,905	—11,574,294	—10,848,904
Florida East Coast	764	4,923,645	2,713,769	8,921,852	1,208,137	1,542,325	71,990	3,446,265	209,658	6,581,021	73.763	2,340,831	365,696	1,972,562	1,217,833
Fonda, Johnstown & Gloversville	88	315,597	580,521	938,212	105,897	90,757	4,283	344,963	48,393	594,294	63.343	343,918	40,250	303,668	36,612
Fort Worth & Denver City	454	4,829,189	2,708,047	7,994,391	1,368,889	1,921,479	57,128	3,661,212	279,236	7,329,931	91.69	664,461	183,813	479,988	—1,512,776
Fort Smith & Western	253	817,785	258,112	1,162,404	280,683	288,323	34,439	491,793	61,440	1,166,504	100.352	—4,100	40,000	—44,660	—99,401
Georgia	328	2,779,233	1,154,696	4,262,916	679,766	950,225	111,495	2,407,617	157,918	4,308,742	101.075	—45,825	47,600	—93,447	—757,738

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Grand Rapids & Indiana	570	$530,148	$361,282	$980,718	$166,034	$312,495	$20,344	$728,806	$59,178	$1,305,282	133.10	—$324,565	$30,255	—$354,823	$568,018
Grand Trunk Western	351	2,132,238	282,402	2,510,355	377,422	412,822	37,266	854,580	59,010	1,757,999	70.029	752,356	51,084	701,261	336,595
Great Northern	8,175	7,303,056	2,054,260	10,519,795	4,121,056	3,921,866	142,017	6,848,052	457,275	15,686,919	149.118	—5,167,124	920,537	—6,089,478	—7,910,087
Gulf & Ship Island	307	170,364	69,439	261,085	152,427	119,554	10,776	179,138	21,478	483,828	185.314	—222,743	21,454	—244,342	—262,391
Gulf Coast Lines	...	861,018	333,842	1,252,130	367,327	241,831	39,928	403,123	49,350	1,100,011	87.85	152,119	28,417	123,683	54,613
Gulf, Colorado & Santa Fe	1,907	1,509,722	636,448	2,258,044	1,049,930	241,000	50,508	2,019,607	88,737	3,942,753	174.609	1,684,709	87,016	—1,771,861	—2,055,966
Gulf, Mobile & Northern	470	222,739	75,551	313,355	300,597	122,451	13,331	238,944	23,308	698,630	222.951	—385,275	14,175	—399,450	—428,328
Hocking Valley	350	1,368,235	133,165	1,629,920	276,012	408,685	14,511	772,106	49,700	1,520,945	93.314	108,975	59,778	49,180	—365,666
Illinois Central	4,799	8,745,370	2,672,834	12,488,634	3,994,535	3,897,588	151,053	8,049,859	402,828	16,599,366	132.915	—4,110,733	762,331	—4,873,349	—5,853,751
Illinois Terminal	870	93,285	.....	95,975	8,949	15,478	1,251	32,917	6,341	64,936	67.660	31,040	1,117	29,923	21,034
Indiana Harbor Belt	121	.....	.....	833,308	70,460	615,959	3,974	800,573	26,701	1,517,667	182.123	—684,359	10,686	—695,057	—697,591
International & Great Northern	1,159	1,141,506	358,385	1,627,655	417,427	573,557	25,170	1,059,657	56,367	2,142,204	131.613	—514,549	24,831	—539,561	—390,866
Kanawha & Michigan	176	374,712	63,123	454,132	130,518	162,707	7,118	196,619	15,821	512,782	112.915	—58,650	66,129	—124,779	—164,891
Kansas City, Mex. & Orient R.R. of Tex.	465	123,946	30,867	163,281	138,254	85,006	7,185	187,466	9,920	427,831	262.021	—264,550	5,575	—270,125	—225,426
Kansas City, Mex. & Orient Receiver	272	115,467	24,846	147,800	87,103	80,408	7,625	157,936	23,004	356,076	240.920	—208,277	7,700	—215,977	—186,599
Kansas City Southern	779	1,180,854	299,183	1,612,034	226,332	369,020	62,100	1,064,999	83,145	1,803,677	111.888	—191,643	73,300	—265,081	—506,608
Kansas City Terminal	27	.....	.....	140,417	47,555	51,478	.....	111,578	4,248	217,356	154.793	—76,940	27,350	—104,290	—129,458
Lake Erie & Western	741	927,750	91,393	1,676,966	104,136	379,974	16,786	604,122	33,159	1,137,728	67.844	—60,762	44,988	—105,750	—263,650
Lake Superior & Ishpeming	34	250,814	204	282,148	29,775	23,067	220	74,838	4,087	131,987	46.78	150,160	4,931	145,229	80,229
Lake Terminal	13	.....	222	114,828	17,792	21,967	.....	114,715	60	154,534	134.558	—39,707	5,816	—45,523	—27,603
Lehigh & Hudson River	96	292,746	5,999	278,734	47,211	71,545	2,490	236,436	10,603	368,285	132.308	—89,551	8,600	—98,151	—167,372
Lehigh & New England	229	375,056	1,954	390,011	156,237	118,912	4,132	214,767	18,358	512,360	131.371	—122,349	15,453	—137,802	—325,271
Lehigh Valley	1,435	5,724,389	881,431	7,088,753	2,141,501	2,556,935	89,993	4,112,451	155,157	9,093,434	128.280	—2,004,682	206,000	—2,213,810	—3,115,182
Long Island	398	673,835	2,042,332	3,003,592	675,701	702,804	32,324	1,820,377	83,464	3,337,160	111.105	—333,568	105,114	—439,839	—1,176,388
Los Angeles & Salt Lake	1,169	1,095,180	666,589	1,932,547	364,711	380,082	36,256	691,974	40,558	1,590,986	82.326	341,561	*108,675	232,795	—136,568
Louisiana & Arkansas	302	269,504	56,767	335,244	127,571	73,843	5,735	159,687	8,979	375,812	112.101	—40,568	18,138	—58,712	—26,349
Louisiana Ry. & Navigation Co.	344	356,147	50,859	427,759	84,447	48,528	8,332	174,059	11,276	326,641	76.361	101,118	14,000	87,118	16,223
Louisville & Nashville	5,041	7,942,649	2,703,132	11,279,962	2,523,945	3,803,789	170,178	6,078,074	282,524	12,910,242	114.452	—1,630,280	302,611	—1,932,919	—3,698,843
Louisville, Henderson & St. Louis	199	197,340	77,590	289,463	98,751	65,112	9,316	138,793	12,355	324,327	112.045	—34,864	7,215	—42,090	—93,803
Maine Central	1,216	1,083,073	636,991	1,882,962	359,421	529,129	20,204	1,377,676	36,195	2,332,763	123.888	—449,800	101,032	—552,461	—656,597
Maryland, Delaware & Virginia	83	82,147	95,710	184,301	16,313	126,377	2,322	112,632	3,869	261,513	141.895	—77,213	2,000	—79,213	124,466
Michigan Central	1,862	4,912,137	2,487,632	8,301,363	1,353,268	2,543,871	125,271	3,529,933	162,963	7,840,638	94.450	460,725	34,865	425,762	—2,243,825
Midland Valley	389	342,058	108,361	467,423	146,924	62,115	4,510	171,658	21,760	406,967	87.066	60,456	7,183	53,224	—19,122
Minn., St. Paul & Sault Ste. Marie	4,244	3,096,996	1,013,798	4,495,690	1,288,455	1,360,287	60,251	2,551,057	162,485	5,496,055	122.25	—1,000,365	297,326	—1,298,066	—2,066,291
Minneapolis & St. Louis	1,647	980,230	248,779	1,303,998	602,539	452,197	31,123	1,101,264	60,092	2,245,777	172.222	—941,780	56,413	—998,231	—1,159,729
Minnesota & International	195	55,438	28,324	90,092	49,254	30,906	1,039	68,018	5,795	155,012	172.060	—64,920	2,326	—67,240	—68,316
Mississippi Central	164	74,160	29,350	107,598	78,925	37,979	4,594	61,055	11,423	193,976	180.279	—86,378	5,000	—91,380	—72,663
Missouri & North Arkansas	364	104,235	68,066	184,250	106,443	60,461	7,183	116,537	12,172	302,593	164.230	—118,343	—2,526	—115,817	—101,818
Missouri, Kansas & Texas	1,716	2,583,036	830,739	3,680,534	851,073	1,070,583	51,835	1,292,525	189,747	3,471,984	94.333	208,550	122,659	85,435	—757,526
Missouri, Kansas & Texas R.R. of Texas	1,737	1,362,459	836,425	2,391,625	1,122,463	549,266	50,073	1,130,057	109,650	2,984,048	124.770	—592,424	42,083	—636,053	—746,799
Missouri, Oklahoma & Gulf	329	186,506	30,167	227,672	77,852	82,552	3,296	153,750	11,568	329,271	144.625	—101,599	8,000	—109,603	—51,665
Missouri Pacific	7,300	7,213,972	2,286,044	10,300,158	5,008,786	5,389,301	225,775	6,869,549	395,091	17,967,195	174.436	—7,667,037	1,122,700	—8,790,570	—10,266,095
Mobile & Ohio	1,165	1,213,241	255,306	1,562,754	536,160	525,331	40,824	854,781	60,796	2,019,008	129.195	—456,254	59,905	—516,159	—603,425
Monongahela	107	397,116	32,533	438,821	159,476	70,294	1,828	203,705	10,412	445,715	101.571	—6,895	6,293	—13,187	—227,372
Monongahela Connecting	7	.....	.....	272,064	30,185	30,738	562	138,792	6,325	206,603	75.94	65.461	15,349	50,112	44,960
Montour	57	163,347	1,130	167,739	38,755	58,800	1,487	44,387	7,721	152,248	90.904	15,491	2,481	31,010	25,717
Mineral Range	101	59,465	355	62,168	29,336	29,392	328	48,413	1,929	109,398	175.969	—47,230	4,300	—51,530	—47,701
Nashville, Chattanooga & St. Louis	1,247	1,245,780	560,294	1,941,109	889,812	557,305	65,381	1,024,893	64,578	2,605,316	134.22	—664,207	55,000	—719,438	—968,930
Nevada Northern	165	144,367	11,746	162,338	43,762	34,047	995	45,093	6,261	130,205	80.206	32,133	20,832	11,301	56,382
New Jersey & New York	48	14,029	98,957	122,594	18,424	38,580	1,713	93,115	2,826	154,659	126.15	—32,064	1,927	—33,992	—54,781
New Orleans Great Northern	284	165,382	69,525	248,693	135,429	80,426	7,150	128,769	12,390	364,834	146.700	—116,141	12,227	—128,391	—180,568
New York Central	6,069	19,118,617	10,371,412	33,884,287	5,215,174	11,220,243	413,228	17,338,827	937,661	35,676,526	105.289	—1,792,486	1,007,486	—2,800,203	—10,857,352
New York, Chicago & St. Louis	575	2,456,829	149,886	2,692,725	383,389	448,306	60,994	1,258,317	77,766	2,234,801	82.994	457,925	135,000	322,924	—56,204
New York, New Haven & Hartford	1,981	5,176,359	5,191,785	11,856,669	2,815,517	3,262,846	74,267	6,033,256	494,152	12,941,248	109.147	—1,084,579	449,500	—1,535,174	—3,393,162
New York, Ontario & Western	569	707,173	700,882	1,580,323	560,539	459,193	18,048	852,619	34,801	1,925,201	97.216	—344,878	35,500	—380,378	—949,919
New York, Philadelphia & Norfolk	122	634,455	176,128	886,759	104,357	274,662	13,206	585,903	25,619	1,021,646	115.21	—134,887	85,195	—220,149	—173,262
New York, Susquehanna & Western	136	271,901	70,921	400,277	84,107	103,507	4,066	250,572	14,650	456,902	114.146	—56,624	24,169	—80,803	—138,071
Norfolk & Western	2,200	5,332,316	1,098,783	6,795,319	1,568,022	2,897,988	80,185	3,839,288	168,141	8,557,116	125.926	—1,761,797	425,000	—2,186,808	—3,595,266
Northern Pacific	6,655	6,048,038	2,181,359	9,098,022	1,731,855	2,725,115	114,115	5,494,221	386,910	10,607,553	116.591	—1,509,531	942,746	—2,452,853	—4,583,508
Norfolk Southern	944	379,681	235,398	659,338	304,867	251,689	30,793	567,289	50,219	1,205,154	182.78	—545,815	26,876	—572,691	—659,031
Northwestern Pacific	536	473,217	314,151	880,844	163,610	109,581	8,535	405,704	21,145	711,765	80.805	169,079	30,571	138,507	—107,573

REVENUES AND EXPENSES OF RAILWAYS

EIGHT MONTHS OF CALENDAR YEAR 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of—Way and structures.	Maintenance of—Equipment.	Traffic.	Transportation.	General.	Total.					
Georgia & Florida	405	$631,677	$208,044	$930,600	$533,213	$218,649	$44,275	$687,115	$72,231	$1,555,482	167.078	—$624,882	$50,473	—$675,605	—$428,874
Grand Rapids & Indiana	570	3,711,369	1,594,588	5,918,423	844,745	1,556,130	109,064	3,464,300	244,106	6,241,063	105.45	—322,640	261,751	—584,412	872,925
Grand Trunk Western	351	8,351,917	1,777,183	10,969,275	1,490,629	2,860,055	167,172	5,157,130	359,726	10,101,485	92.088	867,790	386,779	481,078	—1,386,535
Great Northern	8,175	51,873,583	13,106,174	75,541,016	18,692,647	16,882,218	736,770	33,831,726	1,879,611	73,131,647	96.810	2,409,369	6,317,383	—3,921,793	—11,540,475
Gulf & Ship Island	307	1,310,989	404,298	1,886,403	610,137	501,878	47,925	843,843	105,967	2,113,333	112.029	—226,931	154,695	—381,956	—328,238
Gulf Coast Lines	....	5,446,543	2,089,334	8,040,411	2,145,616	1,484,474	172,244	2,926,556	326,167	7,046,975	87.64	993,436	219,000	772,647	167,333
Gulf, Colorado & Santa Fe	1,915	10,810,122	4,124,784	16,301,883	4,789,570	3,741,013	216,563	8,156,436	459,055	17,330,856	109.379	—1,028,974	693,929	—1,724,389	—2,598,575
Gulf, Mobile & Northern	469	1,748,899	462,568	2,394,791	1,032,337	634,555	84,235	1,167,313	122,009	3,040,449	126.960	—645,658	108,052	—754,156	—680,542
Hocking Valley	350	8,116,672	853,570	9,602,500	1,303,109	3,535,934	79,386	3,976,868	281,243	9,176,382	95.562	426,118	543,981	—117,880	—991,071
Illinois Central	4,799	63,980,678	17,410,138	89,914,786	17,961,449	24,662,262	828,827	40,948,993	2,143,524	87,263,268	97.051	2,651,518	4,918,604	—2,283,137	—6,023,023
Illinois Terminal	12	624,961	.....	659,675	36,010	77,973	6,259	168,558	40,786	329,588	49.962	330,088	9,099	320,979	293,243
Indiana Harbor Belt	121	.....	.....	5,253,545	895,134	1,986,817	21,154	4,191,685	169,970	7,264,759	138.283	—2,011,214	85,614	—2,096,986	—1,822,308
International & Great Northern	1,159	8,141,686	2,255,174	11,465,331	2,536,566	3,090,232	161,813	6,296,037	398,936	12,527,465	109.263	—1,062,135	244,834	—1,311,284	—481,452
Kanawha & Michigan	176	2,620,279	421,064	3,188,586	676,959	1,276,687	26,379	1,325,183	110,489	3,415,698	107.122	—227,111	242,185	—469,300	—501,317
Kansas City, Mex. & Orient R. R. of Tex.	465	866,239	183,003	1,139,603	585,720	410,740	30,298	738,374	72,730	1,837,862	161.272	—698,259	50,844	—749,430	—257,400
Kansas City, Mex. & Orient, Receiver.	272	816,034	150,741	1,038,835	392,960	387,140	30,980	652,135	87,547	1,550,761	149.279	—511,927	61,615	—573,590	—156,827
Kansas City Southern	779	8,944,375	1,964,730	11,902,048	1,839,658	2,667,489	271,929	5,102,260	506,928	10,382,138	87.156	1,519,911	543,617	974,636	148,424
Kansas City Terminal	27	.....	.....	993,693	185,889	263,344	.....	570,088	22,366	1,060,862	106.760	—67,169	225,721	—292,895	—310,411
Lake Superior & Ishpeming	34	969,445	1,894	1,093,944	163,374	147,563	1,746	251,216	22,984	586,884	53.65	507,061	38,637	468,424	320,682
Lake Erie & Western	741	6,190,110	538,056	7,175,262	1,015,015	2,581,729	126,571	3,346,307	215,275	7,282,194	101.490	—106,932	321,531	—428,990	317,576
Lake Terminal	12	.....	1,692	846,371	135,548	216,291	.....	614,187	463	966,489	114,192	—120,118	46,788	—166,906	—84,871
Lehigh & Hudson River	96	1,634,507	31,371	1,739,844	237,694	376,384	14,206	990,896	62,573	1,681,753	96.661	58,091	69,151	—11,089	—287,314
Lehigh & New England	229	2,777,170	16,416	2,910,952	487,432	659,265	40,424	1,140,862	107,669	2,433,366	83.593	477,586	111,838	365,748	—117,506
Lehigh Valley	1,435	35,957,559	4,933,348	44,665,823	8,460,633	14,244,392	537,196	26,791,793	1,054,510	51,303,620	114.860	—6,637,797	1,588,000	—8,230,074	—10,635,831
Long Island	398	4,215,999	10,696,989	16,671,484	2,670,031	3,537,942	137,521	9,450,047	466,727	16,386,441	98.290	285,042	823,616	—541,934	—3,398,383
Los Angeles & Salt Lake	1,169	8,040,816	3,857,160	13,141,572	1,784,067	2,503,653	217,602	4,730,525	302,274	9,968,856	75.857	3,172,716	672,535	2,499,277	501,234
Louisiana & Arkansas	304	2,153,780	406,925	2,681,491	593,511	395,075	37,168	934,025	64,619	2,024,296	75.491	657,195	138,673	518,402	663,795
Louisiana Railway & Navigation Co.	344	2,209,587	347,737	2,715,437	675,054	448,340	48,988	1,210,565	89,933	2,472,881	91.067	242,557	112,000	130,436	165,868
Louisville & Nashville	5,041	56,883,328	16,854,428	80,097,497	14,996,988	22,696,123	1,342,519	37,790,936	1,950,963	79,181,461	98.856	916,036	2,364,105	—1,451,214	—8,304,665
Louisville, Henderson & St. Louis	199	1,352,113	487,678	2,004,284	514,592	283,837	43,222	736,237	71,249	1,649,137	82.280	355,147	30,143	324,992	—22,072
Maine Central	1,216	8,269,731	3,380,883	12,792,851	2,629,180	3,296,338	107,421	7,997,965	377,076	14,434,977	112.836	—1,642,126	745,223	—2,389,142	—1,583,158
Maryland, Delaware & Virginia	83	487,201	298,339	828,161	85,574	353,090	7,110	607,322	20,786	1,073,881	129.670	—245,720	16,000	—261,775	215,053
Michigan Central	1,862	33,468,070	14,764,858	54,558,815	7,952,914	14,988,368	629,316	24,711,582	1,098,829	50,293,792	92.182	4,265,022	1,767,365	2,492,925	—8,544,033
Midland Valley	389	2,072,580	800,981	3,020,130	814,289	580,227	28,404	1,195,473	139,391	2,757,784	91.313	262,346	57,467	204,463	—248,420
Minn., St. Paul & Sault Ste. Marie	4,243	20,210,442	5,843,226	28,995,131	5,834,136	6,021,880	321,450	13,632,546	804,279	26,859,724	92.64	2,135,408	2,246,368	—113,529	—3,316,637
Minneapolis & St. Louis	1,647	7,783,577	1,791,233	10,313,812	2,263,823	2,863,285	151,394	5,824,814	314,499	11,418,706	110,712	—1,104,894	467,860	—1,573,863	—1,470,995
Minnesota & International	195	533,570	239,846	832,723	229,279	162,540	4,626	423,700	31,448	851,590	102.265	—18,867	39,725	—58,589	—24,255
Mississippi Central	164	430,237	179,165	658,077	317,202	272,961	18,968	350,126	69,482	1,028,738	156.325	—370,661	34,615	—405,439	—297,801
Missouri & North Arkansas	364	786,279	378,752	1,288,791	511,458	300,505	26,885	612,502	68,608	1,519,754	117.921	—230,962	39,420	—270,416	193,038
Missouri, Kansas & Texas	1,715	17,347,626	5,540,900	25,222,968	5,040,571	7,224,908	308,804	9,199,146	900,254	22,808,533	90.427	2,414,435	894,391	1,516,732	—898,461
Missouri, Kansas & Texas R. R. of Texas	1,753	10,191,193	5,913,612	17,894,757	5,272,234	3,812,837	255,166	10,109,397	728,978	20,367,574	113.818	—2,472,817	459,060	—2,936,222	—3,281,334
Missouri, Oklahoma & Gulf	329	1,297,374	191,899	1,571,701	396,693	444,304	19,869	849,654	75,101	1,787,202	113.711	—215,501	85,566	—301,256	294,136
Missouri Pacific	7,300	51,802,723	14,091,744	73,138,449	17,312,687	19,424,602	1,158,723	32,652,224	2,097,907	73,057,040	99.888	81,409	2,953,941	—2,889,578	—6,792,042
Mobile & Ohio	1,110	9,279,919	1,553,641	11,756,705	2,644,286	3,866,238	257,498	5,842,875	397,859	13,016,414	110.714	—1,259,709	481,418	—1,741,446	—990,477
Monongahela Connecting	7	.....	.....	2,039,893	230,486	282,952	4,484	940,767	51,276	1,509,965	74.02	529,928	136,075	393,853	518,882
Monongahela	108	2,136,673	209,155	2,405,845	913,214	476,165	7,052	954,404	63,608	2,414,443	100.358	—7,598	47,758	—55,356	—764,744
Montour	57	829,221	10,127	869,704	231,051	388,957	9,428	293,820	58,583	998,885	114.853	—129,181	19,426	—148,607	21,039
Mineral Range	101	414,926	2,458	434,044	132,870	160,597	2,395	255,227	9,669	560,758	129.194	—126,714	30,500	—157,236	—77,247
Nashville, Chattancoga & St. Louis	1,247	10,858,527	3,549,757	15,795,340	3,301,577	4,404,403	445,357	7,239,949	444,600	15,892,816	100.62	—97,476	359,500	—458,617	—732,332
Nevada Northern	165	1,140,677	81,886	1,270,851	238,561	217,180	7,123	328,525	39,729	832,026	65.470	438,825	80,897	357,927	190,272
New Orleans Great Northern	284	1,214,052	409,345	1,703,355	452,311	384,197	35,981	721,468	81,828	1,697,475	99.655	23,881	95,111	—71,292	—131,244
New Jersey & New York	48	105,042	668,162	835,340	97,923	159,549	10,623	527,113	18,963	814,171	96.31	21,169	17,291	3,866	—15,839
New York Central	6,069	129,352,611	61,473,962	225,830,997	35,250,360	65,128,947	2,299,900	112,869,500	6,154,101	225,526,316	99.865	304,681	8,486,668	—8,204,825	—38,981,932
New York, Chicago & St. Louis	575	15,969,796	826,416	17,453,642	2,021,074	3,031,922	337,591	7,320,265	538,261	13,293,947	76.167	4,159,695	600,000	3,557,620	325,289
New York, New Haven & Hartford	1,981	34,021,407	32,782,594	78,273,498	13,657,313	19,541,989	466,511	42,787,275	2,852,263	80,844,252	103.284	—2,570,755	2,930,535	—5,512,181	—10,722,256
New York, Ontario & Western	569	4,557,177	2,345,846	8,214,450	1,689,625	2,089,510	88,128	4,112,001	216,708	8,195,972	99.775	18,478	252,983	—234,507	999,111
New York, Philadelphia & Norfolk	122	3,901,223	840,772	5,207,034	539,481	1,522,339	78,603	3,220,103	118,593	5,608,210	107.70	—401,175	246,602	—647,990	—1,325,392
New York, Susquehanna & Western	136	1,963,462	504,255	2,816,071	425,160	649,127	22,467	2,088,864	78,309	3,263,923	115.903	—447,851	170,800	—621,814	—589,022
Norfolk Southern	920	3,421,671	1,328,882	5,143,973	1,284,564	1,113,860	112,774	2,719,702	242,892	5,475,202	106.44	—331,229	152,416	—484,368	—398,078
Norfolk & Western	2,201	41,378,334	6,295,343	50,723,454	8,592,574	19,091,277	459,608	23,564,542	1,241,408	53,126,181	104.736	—2,402,727	3,120,000	—5,525,477	—12,446,892
Northern Pacific	6,652	46,985,632	13,838,560	68,048,442	14,364,500	14,098,404	649,533	28,411,002	1,873,900	60,458,632	88.846	7,589,811	6,161,277	1,419,154	—7,972,662
Northwestern Pacific	538	2,564,860	1,871,355	5,056,236	947,374	640,818	47,789	2,164,459	127,092	3,947,998	78.077	1,108,238	214,690	893,643	223,774

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.					
Oregon Short Line	2,358	$2,857,085	$806,095	$4,031,599	$975,826	$748,432	$46,263	$1,512,618	$159,254	$3,541,073	87.833	$490,525	$441,021	$49,504	—$1,463,461
Oregon-Washington R.R. & Nav. Co.	2,223	2,002,168	749,738	2,998,038	886,897	627,841	54,250	1,439,586	166,947	3,214,633	107.224	—216,595	213,728	—430,349	—1,298,069
Panhandle & Santa Fe	857	664,880	244,692	955,548	417,522	380,153	10,649	613,652	29,285	1,445,972	151.324	—490,425	19,041	—510,701	—673,793
Pennsylvania Railroad Co.	7,260	33,693,529	13,276,034	51,571,437	12,974,296	22,654,563	483,971	37,182,365	1,875,416	76,189,686	147.73	—24,618,250	1,893,819	—26,513,210	—34,839,876
Peoria & Pekin Union	19	31,335	4,835	146,694	27,065	64,629	486	159,266	6,430	257,875	175.790	—111,181	9,500	—120,681	—87,915
Pere Marquette	2,238	2,723,415	865,536	3,930,443	724,897	1,169,501	51,687	2,179,895	151,063	4,288,399	109.107	—357,956	65,864	—423,895	—1,607,185
Perkiomen	41	98,204	14,469	116,643	18,391	5,572	13	50,486	280	74,759	64.093	41,884	3,449	38,435	—12,143
Philadelphia, Beth. & New England R. R.	10	.....	.....	108,204	15,298	13,965	476	83,952	1,823	115,514	106.756	—7,310	1,335	—8,645	—7,767
Philadelphia & Reading	1,126	5,916,019	1,204,040	7,584,098	2,139,296	3,425,750	97,135	6,476,091	256,923	12,431,402	163.914	—4,847,304	252,671	—5,100,437	—6,318,362
Pittsburgh, Cin., Chicago & St. Louis	2,383	3,837,906	2,427,528	7,299,316	2,502,279	4,765,344	166,563	7,224,764	372,488	15,157,430	207.89	—7,858,114	315,876	—8,173,990	8,794,571
Pittsburgh, Shawmut & Northern	210	111,259	6,735	120,864	51,295	76,770	2,703	87,969	10,538	229,289	189.71	—108,425	1,885	—110,310	—82,869
Pittsburgh & Lake Erie	224	2,903,918	324,929	3,476,607	765,047	1,229,693	22,694	1,319,479	72,587	3,410,066	98.086	66,541	246,906	—180,379	—863,319
Pittsburgh & Shawmut	103	125,757	5,119	132,710	53,655	57,237	1,615	72,141	7,506	192,153	144.792	—59,443	7,248	—66,692	—73,169
Pittsburgh & West Virginia	53	231,770	11,982	265,410	131,063	66,103	1,799	117,538	11,380	344,086	129.643	—78,676	12,798	—91,474	—68,186
Port Reading	21	133,691	.....	161,697	35,771	7,883	18	125,141	367	169,180	104.628	—7,483	6,611	—14,094	—83,012
Quincy, Omaha & Kansas City	255	87,047	29,098	118,838	61,623	81,655	1,024	83,275	3,592	231,114	194.48	—112,276	3,922	—116,198	—115,854
Richmond, Fredericksburg & Potomac	117	420,993	309,328	880,854	104,320	155,288	9,086	404,000	29,926	723,462	82.132	157,393	32,150	124,932	—347,592
Rutland	415	258,794	188,529	543,661	97,020	159,110	7,306	258,151	15,227	539,261	99.191	4,392	18,018	—13,626	—59,837
St. Joseph & Grand Island	258	269,788	36,537	326,100	150,142	69,230	3,649	176,675	21,907	422,904	129.685	—96,804	13,132	—109,936	—120,579
St. Louis Merchants Bridge Terminal	9	.....	.....	397,258	85,252	99,373	1,168	443,025	16,503	645,320	162.443	—248,063	28,141	—276,223	—302,961
St. Louis-San Francisco	4,757	5,054,099	2,661,768	8,100,832	2,513,984	2,497,992	107,957	3,854,387	307,956	9,228,243	113.917	—1,127,411	373,486	—1,502,956	—3,572,749
St. Louis Southwestern	968	1,514,015	252,212	1,843,435	293,634	257,458	53,728	575,903	57,649	1,244,181	60,995	599,254	65,511	533,743	149,322
St. Louis Southwestern of Texas	807	553,960	193,495	806,246	306,781	240,769	21,140	433,839	21,438	1,023,608	126.960	—217,362	23,000	—240,384	—224,695
St. Louis Transfer	6	.....	.....	126,477	14,735	25,652	300	98,984	3,819	143,491	113.453	—17,014	613	—17,627	—54,357
San Antonio & Arkansas Pass	736	370,511	179,789	586,666	135,087	159,257	10,805	335,318	29,337	669,259	114.078	—82,593	13,750	—96,357	8,833
San Antonio, Uvalde & Gulf	317	92,196	35,972	136,308	32,410	35,432	2,451	46,605	6,961	123,861	90.869	12,448	2,277	10,162	1,860
Seaboard Air Line	3,563	2,171,451	1,039,836	3,619,595	931,887	1,224,989	164,237	2,236,299	341,131	4,929,736	136.195	—1,310,141	135,000	—1,446,206	—1,610,601
South Buffalo Ry Co.	11	75,254	.....	136,038	5,520	18,844	345	106,804	1,806	133,319	98.002	2,720	4,000	—1,280	11,512
Southern	6,971	8,390,430	3,955,824	13,609,929	1,342,940	2,760,430	167,448	6,119,836	296,013	10,406,706	76.464	3,203,223	427,024	2,760,526	574,292
Alabama Great Southern	313	772,041	277,297	1,118,079	97,420	274,727	20,080	444,212	26,904	872,783	78.061	245,297	35,563	209,722	80,975
Cincinnati Northern of Texas Pacific	338	1,466,732	426,825	2,007,672	170,846	481,749	28,313	733,344	41,992	1,466,710	73.055	540,962	61,123	479,800	537,378
Georgia Southern & Florida	402	291,498	127,270	473,492	49,759	115,595	7,326	249,364	13,473	437,091	92.312	36,401	19,336	17,065	—27,337
New Orleans & Northeastern	207	541,205	125,972	727,413	118,839	82,258	11,585	307,203	16,999	542,392	74.562	185,021	43,712	141,285	19,519
Northern Alabama	110	100,955	20,234	123,938	33,904	8,306	1,614	54,378	3,537	101,740	82.090	22,198	3,918	18,281	—16,450
Southern in Mississippi	278	62,024	64,293	139,384	106,692	22,567	3,006	95,166	7,069	234,499	168.240	—95,116	9,800	—104,916	—114,029
Spokane, Portland & Seattle	549	520,111	300,441	880,107	353,435	138,859	12,458	374,540	30,742	920,369	104.574	—40,263	117,546	—157,809	—424,438
Spokane International	165	101,004	23,999	128,783	30,364	9,120	2,267	39,863	5,949	87,531	67.968	41,252	5,261	35,975	4,352
Staten Island Rapid Transit	23	81,007	137,680	247,335	97,026	37,299	2,629	182,193	16,402	335,459	135.629	—88,123	15,000	—103,458	—159,171
Tennessee Central	292	170,523	71,015	254,822	46,999	51,934	5,635	144,095	11,569	260,229	102.122	—5,407	5,719	—11,132	—21,529
Terminal R. R. Association of St. Louis	36	.....	.....	411,187	159,464	105,919	1,253	340,281	13,062	627,785	152.676	—216,598	32,180	—248,805	—293,681
Texarkana & Fort Smith	93	144,124	27,093	182,953	33,695	18,238	3,961	109,583	10,656	175,864	96.126	7,089	8,070	—980	—45,593
Texas & Pacific	1,946	2,000,102	1,112,405	3,412,380	1,010,746	864,918	54,017	2,109,854	151,778	4,243,993	124.370	—831,613	89,150	—920,914	—1,599,964
Toledo & Ohio Central	503	1,184,325	86,314	1,355,281	251,291	416,567	14,937	565,628	25,013	1,277,043	94.227	78,238	—17,719	95,957	—102,495
Toledo, Peoria & Western	247	161,108	63,902	238,608	44,297	118,508	7,017	202,535	10,135	382,491	160.301	—143,883	8,500	—152,383	—155,808
Toledo, St. Louis & Western	454	1,018,669	52,826	1,105,856	295,111	247,718	21,641	522,687	18,480	1,105,614	99.978	242	31,000	—30,758	—212,118
Trinity & Brazos Valley	368	135,380	31,808	174,113	103,740	110,171	3,758	158,895	26,165	402,730	231.304	—228,617	7,210	—235,827	—180,574
Ulster & Delaware	128	70,267	106,431	201,451	36,287	36,260	5,157	173,063	11,126	262,945	130.526	—61,494	5,000	—66,494	—82,656
Union R. R. of Pennsylvania	45	.....	.....	937,626	112,866	190,972	1,056	804,131	9,594	1,118,619	126.510	—180,993	11,105	—192,098	—217,776
Union Pacific	3,614	8,776,887	2,409,271	12,448,429	2,598,924	2,491,564	123,214	3,817,702	404,956	9,691,983	77.857	2,756,446	894,721	1,860,511	—2,425,342
Utah Railway	98	180,197	754	181,430	29,402	31,179	294	40,863	3,470	105,208	57,988	76,222	5,173	71,049	23,018
Vicksburg, Shreveport & Pacific	171	207,206	119,022	352,899	147,311	103,210	15,417	211,784	20,234	502,545	142,405	—149,646	14,036	—163,701	—224,167
Virginian	523	1,445,430	94,899	1,682,737	254,003	418,575	11,539	615,346	41,108	1,334,288	79.292	348,449	63,467	284,971	—143,711
Wabash	2,473	4,130.068	1,189,978	5,773,898	1,118,542	1,398,390	80,765	2,713,211	166,398	5,505.903	95.36	267,995	131,041	136,777	500,999
West Jersey & Seashore	361	593,357	1,532,400	2,274,745	430,296	420,821	13,570	965,501	40,847	1,881,378	82.71	393,367	41,922	351,423	—494,007
Western Maryland	797	1,456.617	156,457	1,721,947	678,381	673,745	71,049	904,061	61,611	2,414,710	140.231	—692,763	50,000	—742,763	—913,275
Western Pacific	1,011	1,284,423	313,054	1,687,013	333,256	271,598	38,775	724,988	54,447	1,458,685	86.465	228,329	66,757	161,338	—453,668
Western Railway of Alabama	133	134,009	93,192	250,237	42,236	62,540	3,094	90,878	7,031	209,536	83.735	40,701	7,175	33,526	—15,997
Wheeling & Lake Erie	511	1,486,684	93,715	1,718,986	488,441	641,201	32,441	921,994	44,468	2,133,028	124.086	—414,042	68,613	—482,793	—584,920
Wichita Falls & N. W.	329	190,655	57,634	261,211	80,095	36,788	1,220	138,868	13,437	270,409	103.52	—9,198	10,742	—19,940	—25,436
Wichita Valley	256	100,212	55,200	162,962	71,924	23,789	187	79,796	1,955	177,651	109.015	—14,689	5,066	—19,757	—65,859
Yazoo & Mississippi Valley	1,381	2,199,963	562,915	2,899,304	1,055,749	724,774	41,829	1,546,432	91,927	3,460,908	119.370	—561,604	137,546	—699,204	—1,575,463

* This includes $27,555.34 representing War Taxes (8% Federal Income Tax) for month of August, and $63,158.17 for period eight months until August 31, 1920.

...August, and $63,158.17 for period eight months until August 31, 1920.

REVENUES AND EXPENSES OF RAILWAYS

EIGHT MONTHS OF CALENDAR YEAR 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.			
Oregon Short Line	2,352	$20,434,051	$5,077,059	$28,269,463	$4,507,770	$4,804,067	$257,320	$9,263,377	$1,018,040	$20,472,728	72.419	$7,796,735	$2,457,104	$5,338,899	—$348,853
Oregon Wash. Railroad & Navigation Co.	2,222	14,454,893	4,932,214	21,533,529	3,999,584	3,954,523	319,794	9,206,783	1,029,076	18,793,964	87.277	2,739,564	1,490,826	1,248,342	—1,416,080
Panhandle & Santa Fe	794	4,079,585	1,272,686	5,749,234	1,520,124	1,971,816	38,303	2,636,439	144,156	6,303,876	109.647	—554,642	160,197	—716,009	—314,045
Pennsylvania Railroad Co.	7,260	219,689,209	84,221,316	337,031,353	62,151,551	115,813,440	3,108,381	185,610,195	9,373,512	382,388,684	113.46	—45,357,332	12,315,874	—57,711,154	—78,836,282
Peoria & Pekin Union	19	213,533	32,392	1,006,953	143,692	296,353	1,978	720,056	38,733	1,201,317	119.301	—194,363	76,000	—270,363	117,503
Pere Marquette	2,231	17,669,866	4,645,950	25,132,796	3,664,233	6,084,162	331.542	12,086,954	851,922	23,095,701	91,894	2,037,095	509,825	1,525,842	—3,349,117
Perkiomen	41	639,589	85,919	771,030	74,538	35,801	110	328,909	2,310	441,829	57.303	329,201	20,692	308,510	—20,716
Philadelphia, Beth. & New Eng. R. R. Co.	10	.....	.....	841,604	126,855	128,952	3,604	606,540	12,436	878,387	104.370	—36,783	8,850	—45,633	—64,089
Philadelphia & Reading	1,126	44,954,661	7,280,782	55,773,637	7,320,876	16,716,961	447,922	30,169,623	1,360,431	56,199,604	100.763	—425,967	1,413,618	—1,842,670	—5,955,559
Pittsburgh, Cin., Chicago & St. Louis	2,383	41,772,025	14,893,861	65,724,895	11,432,242	23,905,500	768,567	35,715,298	1,890,757	74,393,019	113.19	—8,668,125	2,514,001	—11,183,517	13,854,461
Pittsburgh & Lake Erie	224	15,188,879	2,042,062	18,730,682	4,206,819	8,319,830	148,942	7,862,507	486,062	21,037,785	112.317	—2,307,103	1,068,758	—3,376,336	—5,671,136
Pittsburgh, Shawmut & Northern	210	844,583	51,178	919,508	245,750	456,580	14,699	491,810	66,415	1,275,297	138.80	—355,789	15,084	—371,390	—131,172
Pittsburgh & Shawmut	103	988,626	40,965	1,039,380	235,764	279,752	11,343	417,076	51,617	995,551	95.780	43,829	8,076	35,753	197,520
Pittsburgh & West Virginia	63	1,176,634	77,509	1,400,135	480,033	426,545	12,732	574,572	75,089	1,657,225	118.362	—257,090	112,762	—371,440	147,448
Port Reading	21	856,270	.....	1,111,876	154,108	79,202	152	692,441	12,151	938,054	84,367	173,822	63,628	110,194	—424,953
Quincy, Omaha & Kansas City	225	549,199	200,993	847,651	373,231	232,966	4,152	514,538	18,253	1,142,720	134.76	—295,069	30,329	—325,444	—234,569
Richmond, Fredericksburg & Potomac	117	3,474,476	2,426,542	7,334,100	677,934	1,181,479	56,746	2,980,090	206,976	5,194,823	70.831	2,139,277	240,570	1,898,218	—1,776,186
Rutland	415	1,937,373	1,002,496	3,628,186	745,662	1,076,222	43,600	1,892,069	115,271	3,887,797	107.155	—259,612	148,177	—407,802	—432,383
St. Joseph & Grand Island	258	1,626,802	293,386	2,088,739	778,237	373,024	19,339	1,144,123	112,178	2,441,875	116.906	—353,136	95,585	—448,758	—458,460
St. Louis Merchants Bridge Terminal	9	.....	2,892	2,532,239	416,460	510,830	6,959	2,038,934	70,907	3,044,089	120.213	—511,850	102,971	—614,963	—172,809
St. Louis-San Francisco	4,757	38,358,643	16,174,773	58,028,517	10,826,412	14,006,225	553,035	25,064,180	1,853,880	52,163,737	89.893	5,864,780	1,979,998	3,876,693	—5,181,271
St. Louis Southwestern	961	11,178,819	1,485,181	13,344,934	1,867,797	2,297,500	330,229	3,679,479	384,507	8,600,319	64.445	4,744,615	473,028	4,271,446	2,688,113
St. Louis Southwestern of Texas	807	4,229,561	1,050,072	5,811,182	1,934,750	1,882,777	128,215	3,235,887	247,505	7,426,367	127.794	—1,615,185	192,468	—1,808,042	—874,553
St. Louis Transfer	6	.....	.....	875,983	74,256	141,038	1,635	477,402	20,491	714,822	81.602	161,161	2,196	158,965	17,290
San Antonio & Aransas Pass	736	2,058,630	852,038	3,230,079	899,887	842,666	58,247	1,846,379	159,179	3,804,276	117.775	—574,197	116,250	—690,750	38,248
San Antonio, Uvalde & Gulf	317	617,306	316,660	992,084	286,155	186,630	18,160	371,095	47,701	1,109,742	111.860	—117,658	17,831	—135,619	—78,673
Seaboard Air Line	3,563	20,982,013	6,870,963	31,916,922	6,429,365	8,576,596	827,533	16,935,053	1,313,864	34,423,418	107.853	—2,506,496	1,170,000	—3,682,663	—5,569,086
South Buffalo	11	430,217	.....	925,649	54,802	118,912	4,041	623,476	16,784	818,016	88,372	105,634	32,000	73,634	—3,479
Southern	6,974	64,472,884	23,771,893	98,944,410	12,874,648	18,752,655	1,305,431	44,717,041	2,566,954	81,192,788	82.058	17,751,622	3,247,894	14,476,799	7,335,567
Alabama Great Southern	313	5,202,174	1,592,558	7,364,260	752,112	1,629,947	145,698	2,760,518	186,482	5,532,391	75.124	1,831,869	257,360	1,573,492	738,501
Cincinnati, New Orleans & Tex. Pacific	338	9,553,426	2,667,111	13,231,729	1,461,273	3,339,548	209,995	4,877,384	307,520	10,284,519	77.726	2,947,211	437,232	2,508,722	1,551,677
Georgia Southern & Florida	402	2,113,947	1,005,950	3,488,449	510,174	828,162	58,606	1,778,346	97,949	3,293,309	94.406	195,139	150,673	42,815	—74,221
New Orleans & Northeastern	207	3,631,710	851,161	5,019,366	767,174	974,917	85,093	2,069,792	141,293	4,075,572	81.197	943,794	328,712	614,639	368,184
Northern Alabama	210	827,135	119,899	995,446	244,367	60,986	12,602	475,233	21,275	814,464	81,819	180,983	34,353	146,578	140,551
Southern in Miss.	278	653,544	398,583	1,173,405	500,587	204,730	23,724	717,758	48,624	1,495,422	127.443	—322,017	78,400	—400,434	—314,103
Spokane, Portland & Seattle	549	3,732,948	1,520,988	5,723,578	1,375,437	771,028	60,885	1,994,551	190,879	4,461,957	77.957	1,261,621	741,907	517,573	—448,185
Spokane International	160	820,171	149,901	1,000,445	172,457	81,352	18,674	309,690	41,467	626,636	62.636	373,808	40,892	332,591	165,391
Staten Island Rapid Transit	23	615,230	770,150	1,536,136	339,327	277,943	11,342	921,129	85,945	1,635,686	106.480	—99,549	120,000	—220,179	—359,356
Tennessee Central	292	1,331,535	409,368	1,886,450	354,258	407,832	38,100	936,125	83,507	1,819,684	96.461	66,766	44,401	21,717	290,887
Terminal Railroad Ass'n of St. Louis	36	.....	8,483	2,907,845	624,765	545,259	8,173	1,450,891	70,672	2,735,245	94.065	172,601	296,611	—124,066	—133,938
Texarkana & Fort Smith	93	1,000,888	182,331	1,301,212	183,869	135,189	19,279	473,053	49,191	862,084	66.252	439,128	88,080	350,993	243,461
Texas & Pacific	1,946	15,745,348	7,888,288	25,883,069	5,138,707	5,675,532	306,992	11,701,637	786,138	23,949,299	92.528	1,933,770	885,700	1,042,632	—1,605,220
Toledo & Ohio Central	486	6,615,284	547,845	7,605,034	1,254,711	2,447,325	81,182	3,711,161	178,814	7,699,338	101.239	—94,304	329,573	—423,907	—551,411
Toledo, Peoria & Western	247	790,281	411,722	1,320,000	224,093	366,607	22,623	784,673	56,694	1,454,629	110.199	—134,628	68,000	—202,629	—63,840
Toledo, St. Louis & Western	454	6,523,932	285,158	7,177,516	1,499,828	1,484,827	97,500	2,986,440	122,096	6,190,290	86.850	987,226	248,000	738,932	202,172
Trinity & Brazos Valley	368	924,080	178,201	1,174,148	531,520	435,044	17,812	631,322	88,893	1,704,263	145.149	—530,115	62,819	—593,042	—139,711
Ulster & Delaware	128	438,088	265,218	919,876	156,636	181,379	22,307	681,424	56,349	1,102,894	119.896	—183,018	40,000	—223,016	—68,366
Union Railroad of Pennsylvania	45	.....	.....	6,232,915	709,211	1,690,654	2,996	4,145,216	66,326	6,614,404	106.120	—381,488	71,582	—453,070	—670,219
Union Pacific	3,614	54,800,242	14,471,425	78,939,786	13,989,779	15,885,152	672,280	24,475,576	2,489,000	59,579,842	75.475	19,359,944	4,299,050	15,056,978	—6,006,255
Utah	98	1,206,198	6,358	1,216,124	153,756	239,119	1,556	282,733	22,408	699,571	57.524	516,552	51,746	464,806	219,954
Vicksburg, Shreveport & Pacific	171	1,764,905	790,309	2,796,974	521,181	538,385	60,119	1,118,514	96,228	2,364,876	84.551	432,098	106,667	325,251	27,275
Virginian	523	8,904,717	546,033	10,487,353	1,331,408	2,221,193	61,864	4,090,916	237,875	7,929,358	75.608	2,557,995	469,949	2,088,026	816,768
Wabash	2,473	25,199,090	7,113,217	35,944,897	6,805,385	10,123,362	689,535	19,128,387	1,234,104	38,223,424	106.34	—2,278,527	1,029,911	—3,310,817	—4,727,485
West Jersey & Seashore	361	2,445,657	6,034,797	9,153,455	2,105,717	1,957,580	84,242	4,788,452	210,993	9,210,404	100.62	—56,949	402,719	—459,823	—1,076,008
Western Maryland	770	9,988,738	797,217	11,608,844	2,737,001	4,241,570	327,614	5,093,599	405,315	12,936,859	111.439	—1,328,015	386,400	—1,714,415	—1,583,894
Western Pacific	1,018	7,545,747	1,700,069	9,803,088	1,670,984	1,536,964	214,083	3,460,900	290,743	7,378,023	75.262	2,425,164	483,663	1,940,853	705,177
Western Railway of Alabama	133	1,014,656	613,783	1,826,905	270,942	406,860	46,782	692,952	64,417	1,511,075	82.712	315,830	53,200	262,623	—81,065
Wheeling & Lake Erie	511	8,942,998	543,648	10,440,017	1,784,155	2,738,002	114,644	4,702,052	253,421	9,620,652	92.151	819,365	526,731	291,198	—434,819
Wichita Falls & N. W.	329	1,237,167	387,062	1,747,094	504,811	259,322	8,988	934,088	93,998	1,801,092	103.06	—53,997	86,809	—141,119	—27,876
Wichita Valley	256	702,555	321,263	1,095,035	307,302	134,932	468	491,077	13,006	946,701	86,454	148,333	43,774	104,525	12,766
Yazoo & Miss. Valley	1,381	14,568,815	3,893,945	19,630,599	4,689,707	4,734,262	207,316	7,989,845	497,738	18,155,934	92,487	1,474,665	697,760	772,437	—2,279,819

‡ Includes $4.25 war taxes. † Includes $25,000 war taxes.

Traffic News

The Wabash and the New Jersey, Indiana & Illinois announce regular sleeping car service between Detroit, Mich., and South Bend, Ind., leaving Detroit at 11.15 p. m. and South Bend at 1 a. m. The New Jersey, Indiana & Illinois connects with the Wabash at Pine, Ind., and extends from that point northward 12 miles to South Bend.

The South San Francisco Belt Railway, which gives switching service to the industries at South San Francisco, Cal., has applied to the Railroad Commission of California, for authority to increase its rates to $3.50 a car. At present the company is charging $2.50 a car, with a special rate of $1.00 a car when two or more cars are handled for a shipper at the same time.

The American Association of Passenger Traffic Officers elected the following representatives for the ensuing year on October 14: President, W. A. Russell, passenger traffic manager of the Louisville & Nashville; vice-president, John F. Francis, general passenger agent of the Chicago, Burlington & Quincy, and secretary and treasurer, W. C. Hope, general passenger agent of the Jersey Central.

The transcontinental railroads will no longer transport any commodity at a rate based upon the valuation placed upon that commodity by the shipper. With the lone exception of ore, the valuation restriction on all shipments was cancelled at the recent meeting of the executives of the transcontinental lines at Chicago. Commodities formerly carried with valuation restrictions, will be classed as any other merchandise.

Intrastate Rate Proceedings

John E. Benton, solicitor of the National Association of Railway and Utilities Commissioners, has issued another supplemental bulletin regarding the status of intrastate rate proceedings. In the brief filed by the state commissions with the Interstate Commerce Commission in the New York rates and fares case is a statement in tabulated form showing the action taken by the state commissions upon carrier applications for intrastate rate advances, passenger and freight. This tabulation, as printed, covers all states from which information had been received prior to October 8. In some states the increases allowed have been under orders of a temporary character, made pending final orders which will follow further hearings. Since the brief was printed information has been received from the commissions in Kansas and Tennessee, as follows:

Kansas.—The commission has allowed a straight increase in freight rates of 30 per cent, with the following exceptions: No increased was allowed on fuel oil, rates on road building material were increased one-half cent per cwt., and rates on coal were increased according to a sliding scale from 10 to 40 cents per ton. The increase on passenger rates was denied. The Pullman surcharge was allowed and also the increase on baggage rates, and on milk and cream.

Tennessee.—The commission has allowed an increase on freight rates of 25 per cent, corresponding to the interstate increase, with the following exceptions: No increase was allowed on carload shipments of sewer pipe, sand, gravel, brick, road building material, fertilizer and fertilizer material pending further hearing. Passenger rate increases, the Pullman surcharge and increases on baggage rates and milk and cream rates were allowed corresponding to the interstate increases.

Coal Production

Recovering from a temporary depression caused largely by labor disturbances in Northern Ohio, the production of soft coal passed the 12,000,000-ton mark during the week ended October 9. The total output is estimated at 12,075,000 net tons, according to the weekly bulletin of the Geological Survey. This was an increase of 224,000 tons over the week of September 25 and of 706,000 tons, or 6.2 per cent over the week of October 2. The average production per working day, 2,012,000 net tons, was the largest tonnage in any week since last winter, except one. Telegraphic reports of loadings on Monday and Tuesday of the following week indicate a further increase. Production during the first 240 working days of the year has been 416,206,000 net tons, which is about 45¼ million tons less than for the corresponding period of 1918, but 51 2/3 million tons ahead of that for the corresponding period of 1919. Production of anthracite also continued to increase during the week and shipments were the largest of any week since July. Dumpings of soft coal at Lake Erie ports during the week ended October 9 were still short of the million mark. The total is reported as 971,262 tons. The cumulative lake movement from the opening of the season now stands at 16,720,000 tons, as against 24,177,000 in 1918, and 20,005,000 in 1919. The movement to tidewater increased during the week. Cars dumped over tidewater piers numbered 27,697, as against 26,361 in the preceding week. The shipments to New England were 202,000 tons, almost exactly the same as during the preceding week. September set a new record for bituminous coal handled over tidewater piers. The total was 5,447,000 net tons, an increase of 95,000 tons over August, hitherto the record month. New England shipments increased from 1,048,000 to 1,108,000 tons. The all-rail movement to New England recovered again during the week. For the week ending October 2 the percentage of full time output lost on account of transportation disability was 22.4.

According to a statement by the National Coal Association, this 12,000,000 ton-a-week output has been achieved "through aggressive co-operation of the railroads running to the mining fields which, within the last two weeks, have greatly increased the supply of open top cars at the mines." The average weekly output at the soft coal mines was 11,728,250 tons for the four weeks ended October 9, the statement says. Prior to that it had been running at approximately 10,500,000 tons a week. The railroad executives say that, working under the recent priority orders of the Interstate Commerce Commission, they will be fully able to supply enough cars to insure the 12,000,000 ton-a-week output as long as exigency requires it. With the achievement of the 12,000,000 ton output a week, the entire soft coal situation has appreciably eased up.

"Quick results have been obtained in relieving the household situation in Ohio, Indiana, Michigan, Eastern Tennessee, Eastern Kentucky and Western Pennsylvania, where, up to 10 days ago, much concern had been felt over immediate supply. Working under the new program, calling for 2,100 cars a day, or 105,000 tons of soft coal, the railroads are now shipping coal to fill emergency wants in those states. While the car supply at mines in Southern Ohio was short of the scheduled allotment during last week, railroad executives explain that this was due to the necessary diversion of cars to the beet sugar industry, and that they have arranged to overcome this shortage at the mines at once.

"Reports of the National Coal Association show that Chicago, St. Louis and distributing points along the Mississippi and Missouri valley are now getting sufficient soft coal shipments for immediate wants. The railroads will have no difficulty, they say, in keeping up the supply of cars for this movement.

"The movement of bituminous coal to the Great Lakes for trans-shipment to Northwestern points, due to the concerted efforts of the railroads, has now reached the point where the 4,000 car-a-day schedule, embracing the shipment of 1,200,000 tons of soft coal to the Lake docks each week, has finally been attained. Reports show that the loadings at the bituminous mines for the first half of October actually exceeded 4,000 cars a day. Fogs on the lake have prevented moving all of the coal dumped at the docks under this schedule within the last week, but it is expected that, with more favorable weather conditions, the daily lake schedule will easily be carried out from now until the close of navigation, around December 1.

"Altogether the soft coal situation is particularly encouraging. To insure against any shortage in winter supply, the 12,000,000 ton-a-week production must be kept up. It is imperative that the railroads maintain the car schedule necessary for this output."

Commission and Court News

Interstate Commerce Commission

The commission has denied Agent Fairbanks' application asking for authority to establish on less than statutory notice proposed changes in rules of the National Code of Demurrage Rules, providing for the following charges after the expiration of free time: For each of the first 4 days, $3; for each of the next 3 days, $6; for each succeeding day, $10, on cars not subject to the average agreement.

The Commission has suspended until February 12 the operation of certain tariffs of the Spokane & Eastern tariff, providing for the non-absorption of the switching charges at Coeur d'Alene, Idaho, on lumber received from the Northern Pacific originating at Coeur d'Alene and Post Falls, when destined to points on or via the Chicago, Milwaukee & St. Paul, the Great Northern, the Northern Pacific and other lines, resulting in an increase of 2½ cents per 100 lb.

The commission has ordered a proceeding of investigation and a hearing before Examiner Healy, at Raleigh, N. C., on November 12, on a petition filed by the railroads averring that because of an act of the general assembly of North Carolina the state corporation commission is without power to authorize an increase in intrastate passenger fares in excess of 3 cents, and that while 150 pounds is the maximum amount of baggage that can be carried free for each passenger in interstate travel, the general assembly requires carriers to transport not to exceed 200 pounds of baggage per passenger without additional charge, within the state. A hearing has also been announced to be held before Commissioner Woolley at Tampa, Fla., on November 3, on Florida rates.

The commission has also ordered a proceeding of investigation and a hearing before Examiner W. A. Disque at St. Louis, Mo., on November 8 regarding the action of the Missouri Public Service Commission in permitting increases in intrastate freight rates to such an extent only as when coupled with the increases authorized by the Railroad Administration in 1918 would not result in a total increase of more than 70 per cent.

Personnel of Commissions

Seely Dunn, formerly for many years an officer in the operating department of the Louisville & Nashville, has been appointed assistant director of the Bureau of Statistics of the Interstate Commerce Commission at Washington.

Court News

Hours of Service Act Held Applicable To Yard Movements

In an action for an alleged violation of the Hours of Service Act by permitting an employee to work more than 16 hours in the 24 the railroads' only contention was that the act applies only to movements of trains over main line tracks, and not to mere yard movements, as were made in this case. The employee in question was a brakeman in the Pennsylvania's Altoona yards, engaged in connection with an engine moving cars about the yard to make up trains for the purpose of getting cars to points in the yards where they could be iced or repaired. At no time did the engine make any movement along main line tracks. Sometimes 4 cars or less were attached to the engine. Sometimes as many as 15. The Circuit Court of Appeals, Third Circuit, holds that the brakeman was connected with the movement of a train and the company was subject to the penalty. The court holds that although a distinction has been drawn under the federal Safety Appliance Acts between a train consisting of an engine and cars assembled and coupled for a run, and movements in yards to assemble and break up outgoing and incoming trains, these decisions are not applicable to cases arising under the Hours of Service Act.—Pennsylvania v. United States, 265 Fed. 609.

Foreign Railway News

LONDON.

J. H. Thomas, M.P., secretary of the National Federation of Railwaymen, paid a short visit to Prague, where he was the guest of M. Masaryk, president of the Czecho-Slovak Republic.

Russia Buying Engines From Germany

The Soviet government has ordered 6,000 steam locomotives and a large number of turbines from Germany, according to reports from Berlin.

Consortium to Aid Chinese Railways

With the signing of the International Chinese Consortium agreement on October 15, the extension and improvement of that country's railways can be definitely planned. It is thought that the first application for credit under the new agreement will come from those interested in extending the Hukuang Railway. This line is in good physical condition, but is said to be much too short for the territory it is expected to serve.

Bids for Electrification of Chilean Railway

The Chilean Government is asking for bids for the electrification of the first zone of the state railway lines, according to a report from Ambassador Joseph H. Shea at Santiago. This zone includes the line from Valparaiso to Santiago. The bids, which will be received up to March 31, 1921, are of two classes, viz.: those proposing to furnish the electric power, and those proposing to furnish the equipment and rolling stock of the line to be electrified.

To Build India-Afghanistan Railway

Extension of the government railway from Jamrud, where it now terminates, up the Khyber Pass to the Afghan frontier is a project which has been approved by the government of India. The line is of 5 ft. 6 in. gage. It is hoped that the Afghan government will build a line from Kabul, the capital, to connect with this line at the frontier, thereby furthering not only commerce and trade, but the cause of civilization as well, since the projected line would transverse a country inhabited by warlike tribesmen.

Standardization of England's Electrified Railways

LONDON.

A report has just been issued by the Electrification of Railways Advisory Committee appointed by the Minister of Transport in England, which favors standardization both of methods and appliances. The direct current system is favored for general adoption, but it is not proposed to alter the present system of operation on the London, Brighton & South Coast. The committee is to meet again and consider the question of equipment.

England's Ministry of Transport

LONDON.

There has been considerable discussion as to the future of England's Ministry of Transport. It has been reported that the government had seriously considered abolishing it, but Sir Eric Geddes, Minister of Transport, states there is no foundation for such a statement.

State control of the English railways terminates in August, 1921, and automatically the Ministry of Transport will be relieved of some of its present function. During the next session of the British Parliament, the Minister of Transport is to submit a bill dealing with the grouping of the railways of Great Britain in seven sections, each being under a board of management con-

sisting of 21 members, and this bill will form the basis for discussion of the final settlement. It is, of course, expected that there will be a large amount of criticism and opposition on the part of the railway interests in the House of Commons to such a bill. While the cabinet has undoubtedly discussed the matter from time to time, in view of its importance, nothing has occurred and no decisions have been taken likely to disturb the even tenor of Sir Eric Geddes's way or which indicate the early doom of the Transport Ministry.

Demonstration of the Regan Train Control System in England

LONDON.

A demonstration of the train control system of the Regan Safety Device Company, an American company formerly known as the Casale Safety Device Company, was made on the lines of the Great Eastern Railway, England, at Fairlop on the afternoon of September 30, at which a large number of distinguished guests were present, including the Duke of Manchester, J. H. Thomas, M. P., secretary of the National Union of Railwaymen, T. P. O'Connor, M. P., Sir Percival Perry, representative of the Ministry of Transport, and a large delegation of railwaymen.

A special train consisting of a locomotive and eight coaches was operated past "stop" and "caution" signals and a number of conditions were arranged for the purpose of indicating on the engine apparatus one of three condition, as un-

At the Trials of the Regan Train Control in England

limited speed, limited speed, and stop. In every case the tests were satisfactory and the device received commendable endorsement. J. H. Thomas in particular was enthusiastic in his remarks after having ridden on the engine during two or three of the tests.

The Regan system of train control was briefly described in the *Railway Age* of March 19, 1920 (page 948), at the time a similar demonstration run was made on the Chicago, Rock Island & Pacific. In the present case the special train which was used for demonstration purposes consisted of a suburban type locomotive and a train of five bogie and three saloon cars, having a weight of 221 tons. In no case after the "stop" application was applied did the train run more than 500 ft. beyond the "stop" signal, in each case the train being brought under full control before arriving at the stop indication. The trains of the Great Eastern are equipped with the Westinghouse air brakes, which is contrary to the general practice in Great Britain, vacuum brakes being generally used.

The Regan Safety Device Company has opened offices in London at 21 St. James street, S. W. 1. Joseph Beaumont, who was born in England, is chief engineer of the British company and will have entire charge of engineering matters.

Equipment and Supplies

Locomotives

THE SOUTHERN RAILWAY is asking for prices on 50 locomotives.

THE CENTRAL OF GEORGIA is inquiring for 6, 2-6-6-2 type locomotives.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is inquiring for 5 Mikado type locomotives.

THE AMERICAN LOCOMOTIVE COMPANY is building one 0-6-0 type locomotive for use in its shops.

THE PUBLIC BELT RAILWAY OF NEW ORLEANS has ordered 3, 0-6-0 type locomotives from the Baldwin Locomotive Works.

Freight Cars

THE UNION PACIFIC is asking for prices on 50 refrigerator cars.

THE WESTERN MARYLAND is inquiring for 100 55-ton hopper car bodies.

THE LEHIGH & NEW ENGLAND is inquiring for 100, 50-ton gondola cars.

THE DIERKS LUMBER COMPANY, Kansas City, Mo., is inquiring for 25 flat cars.

WOODWARD, WIGHT & CO., New Orleans, La., are inquiring for 5 or 6, 30-ton box cars.

THE MASSACHUSETTS OIL & REFINING COMPANY, Boston, Mass., is asking for prices on 200 cars.

THE NORTHERN PACIFIC has ordered 93 caboose cars from the Pacific Car & Foundry Company.

THE PITTSBURGH COAL COMPANY, Pittsburgh, Pa., is inquiring for from 50 to 150 all-steel gondola car bodies.

THE HAZEL ATLAS GLASS COMPANY, Wheeling, W. Va., is inquiring for 30 hopper cars and 30 gondola cars.

ARNHOLD BROTHERS, 21 State street, New York, are inquiring for 1,000, 40-ton gondola cars for export to China.

THE RICHMOND, FREDERICKSBURG & POTOMAC has ordered 50 55-ton hopper car bodies from the Pressed Steel Car Company.

THE U. S. NAVY is inquiring for one steel flat car of 40 tons capacity and 2 low side composite gondola cars of 40 tons capacity.

CLEMENTS & SON, 120 Broadway, New York, have ordered 10 tank cars of 10,000 gal. capacity from the Chicago Steel Car Company.

THE WESTERN PACIFIC, reported in the *Railway Age* of September 17 as inquiring for 600 gondola cars, has ordered 700 50-ton composite general service cars from the Pressed Steel Car Company.

THE WHEELING & LAKE ERIE, reported in the *Railway Age* of September 3, as inquiring for 3,000 freight cars, has ordered from the Standard Steel Car Company, 1,500 50-ton steel gondola cars; from the Pressed Steel Car Company, 500 50-ton steel gondola cars and 500 40-ton box cars; and from the American Car & Foundry Company, 500 40-ton box cars.

Passenger Cars

THE CHESAPEAKE & OHIO is asking prices on 30 passenger train cars.

THE RICHMOND, FREDERICKSBURG & POTOMAC is asking prices on passenger train cars.

Supply Trade News

James Clarence Harbourt, chief of publicity, at Wilmerding, Pa., of the **Westinghouse Air Brake Company,** Pittsburgh, Pa., died at his home in Pittsburgh, on October 9.

The Keith Railway Equipment Company, Chicago, is completing a new steel freight car shop at Hammond, Ind., which involves an expenditure of $300,000. The extension will give to the company complete facilities for building and repairing both steel and wooden freight cars, and tank cars.

M. A. Kretchmar, chief lubricating engineer of the Sinclair Refining Company, Chicago, has become associated with the **Horrocks Company,** Herkimer, N. Y., as supervising engineer in charge of equipment and sales promotion work. The Horrocks Company manufactures the Danight lubricator.

A. L. Whipple has been appointed representative of the **Locomotive Stoker Company,** Pittsburgh, Pa., with offices at 50 Church street, New York. In 1888 Mr. Whipple entered the service of the Fitchburg Railroad, of which he was later assistant to the purchasing agent. He subsequently served as assistant superintendent of the Hoosac Tunnel & Wilmington Railroad, from which position he entered the railway supply field as representative of the Boston Woven Hose & Rubber Company, and then went to the Curtain Supply Company, Chicago, as general sales agent. In 1907, he was sales manager for Forsyth Brothers Company, Chicago, and in 1913, vice-president of the Standard Heating & Ventilating Company. Mr. Whipple served as entertainment committee chairman of the Master Mechanics' and Master Car Builders' conventions in 1904 and 1905, and vice-president of the Railway Supply Manufacturers' Association in 1908. Before becoming connected with the Locomotive Stoker Company he was vice-president and acting general manager of the Railway Improvement Company, New York City.

A. L. Whipple

The Ackurate Rubber Company, Inc., 253 Broadway, New York, has been incorporated in New Jersey to manufacture insulating tapes, compounds and kindred specialties. **Willard C. Candee,** president, and **Charles V. Ackerman,** secretary and treasurer of the company, have been identified with this branch of the electrical industry for over 20 years. The company is handling its New York City trade direct and will establish agencies in the principal cities throughout the United States.

The St. Louis Pump & Equipment Company, engineers and manufacturers, has been organized, with headquarters at St. Louis, Mo., to manufacture and install liquid handling equipment, specializing in units for gasoline and oil, measuring devices, etc., especially adapted to railroad and industrial use. The company has opened executive offices in the International Life building and temporary factory space has been secured in the western industrial section of St. Louis. **C. C. Fredericks,** of Ft. Wayne, Ind., has been elected general manager, and **John C. Roberts, Jr.,** is president. Others affiliated with the company are: **Willard D. Smith, Sherwood Hines** and **J. S. Farrell.**

American Car & Foundry Company

W. H. Sanford, for many years district manager of the Buffalo, N. Y., plants of the American Car & Foundry Company, New York, has been appointed assistant vice-president in charge of sales in the Buffalo district. This is in connection with the company's plan of extension in that district.

Prior to the formation of the American Car & Foundry Company, Mr. Sanford was employed by the Union Car Company, and when that company was absorbed he was appointed paymaster and cashier at the Depew plant. In 1902 he was appointed local auditor of the Buffalo district, followed by promotion to the position of resident representative. In 1912 he was made district manager in charge of the Depew and Buffalo plants.

Mr. Sanford has been succeeded as district manager by Andrew H. Gairns, who was district manager of the company in Chicago. He will direct the operation of the new plant in Buffalo, also the foundries located there and the plant at Depew. Mr. Gairns has had an extended experience in steel car work and locomotive building and is well qualified to take up the duties demanded by the Buffalo district.

The company's new plant now under construction in Buffalo will be used for building all-steel cars, with a capacity for turning out 20 to 30 cars a day. It will be equipped with the most modern machinery and labor-saving devices known, and there will be a number of features introduced which are entirely new and novel to the car building industry. In addition to the new car-building plant, a modern up-to-date office building will be erected on property recently acquired across Babcock street. The grey iron foundry at the Buffalo plant has been completely re-equipped and is now engaged in quantity production. The Niagara wheel department has also been brought up to a high state of efficiency.

At Depew, during the recent war, the company was the largest producer of 155 mm. shells. Immediately following the armistice, the entire Depew plant was reconstructed and is now capable of building 20 cars a day. E. G. Englehart is assistant district manager at Depew in charge of operations at that place, reporting to Mr. Gairns.

The car company's plans, as outlined above, involve a total expenditure of $3,500,000. With the developments that have taken place, the car company becomes one of the largest manufacturing operations in Buffalo and vicinity.

Trade Publications

STEEL LOCKERS AND SHELVING.—The Van Dorn Iron Works Company, Cleveland, Ohio, has issued a pamphlet illustrating and describing the Van Dorn steel lockers and Van Dorn Simplex shelving.

HOT PROCESS SOFTENER.—"Reap as the Harvester" is the title of a 16-page booklet issued by the Graver Corporation, East Chicago, Ind., which contains an account of the installation and results secured by the Wisconsin Steel Company at South Chicago, Ill., with an installation of the Graver hot process water softener for the treatment of water taken from the Calumet river. The booklet is attractively prepared in three colors with numerous illustrations.

BELT LACING.—Under the title "Short Cuts to Power Transmission," the Flexible Steel Lacing Company, Chicago, has published a practical manual of belting practices. After discussing the factors to be considered in buying belts and describing the more important types in general use, the booklet covers the care of belts and the application of lacing. Valuable information concerning belt speeds, power transmitted, and the cause of belt troubles is given.

WATER SOFTENERS.—"Reap as the Harvester" is the title of a booklet published by the Graver Corporation, East Chicago, Ind., which describes the installation of Graver water softeners at the plant of the Wisconsin Steel Company and the savings effected by their use. In the second part of the book, the construction and operation of the Graver hot-process water softener is described. An interesting feature of the book is the series of artistic drawings of ore docks, blast furnaces and other equipment used in the manufacture of iron and steel.

Railway Construction

BALTIMORE & OHIO.—This company, together with the Chesapeake & Ohio and the American Car & Foundry Company, are considering the proposal of the city officials of Huntington, W. Va., that a viaduct be built over their tracks at Third avenue, Huntington. The proposed structure would have 47 spans from 25 ft. to 32 ft. in length, all of concrete girder and slab floor construction. The plans call for two approaches, one 205 ft. and the other 235 ft. in length, a 36-ft. roadway and two 6-ft. walks. The structure would carry two trolley tracks. The city officials estimate the cost of the improvement at approximately $252,000.

CHICAGO & ALTON.—This company is completing the construction of its freight and office building at Harrison street and the Chicago river, Chicago. This building was begun in 1917, but construction was temporarily stopped during the war.

CHICAGO, BURLINGTON & QUINCY.—This company has ordered plate girder spans for use in the super-structure of the Rock river bridge at Rock Falls, Ill., to replace some Howe truss spans destroyed by fire some time ago. These spans will be erected by company forces.

CHICAGO, MILWAUKEE & ST. PAUL.—This company is constructing three stations to be used by the Northwestern Elevated Railroad, Chicago. The stations are being built at Howard avenue, Rogers Park and Loyola, under the concrete bridges forming a part of the elevated road at these crossings. The stations will be of brick construction, costing $20,000 each, and will be completed about December 1.

CHICAGO, ROCK ISLAND & PACIFIC.—This company contemplates the construction of a frame passenger and freight station at Maryland Heights, Mo. The company is also considering the erection of a car repair shed at Invergrove, Iowa, to cost approximately $25,000.

CHICAGO UNION STATION.—This company has entered into an agreement with the Post Office department for the construction of a post office terminal in Chicago for handling parcel post and transient mail, which is to be utilized in conjunction with the Union Station project. The building will be constructed by the Union Station company and will be leased to the government for a term of 20 years at an annual rental of $500,000 for the first five years, and $310,000 annually for the last 15 years. The new terminal, which will cost approximately $6,000,000, will be located between Harrison and Van Buren streets, just west of the Chicago river. The structure will be 800 ft. in length, 80 ft. wide, 6 stories high, and each floor will have 60,000 sq. ft. of floor space. Railroad tracks connecting the terminal with railways using the Union Station will be constructed beneath the main floor, and will provide space sufficient for 40 cars to be loaded at one time. The five upper floors of the building will be used for working and distributing the mail, and will provide additional space for storage of mail during rush times. It is understood that one of the main purposes of the new building will be to provide facilities for handling the bulkier classes of mail.

ELGIN, JOLIET & EASTERN.—This company is enlarging its power house at Gary, Ind., and is installing two additional boilers of 225 h.p. each to serve the terminal of the road at Kirk Yard, Ind. The company is also replacing its turn-table at Gary with a new 100-ft., 350-ton turn-table operated by motor.

GREAT NORTHERN.—This company has awarded a contract to Peppard & Fulton for rebuilding the outer portion of iron ore dock No. 3 at Allouez Bay, Superior, Wis., and for the construction of an approach to dock No. 1, at an approximate cost of $1,500,000.

MISSOURI, KANSAS & TEXAS.—This company has entered into a contract with the Texas & Pacific for the joint use of the line between Whitesboro, Tex., and Ft. Worth. Under the terms of the agreement the line is being relaid with new 85-lb. rail, and all-wood trestles, and steel spans are being repaired and strengthened. The work is expected to be completed before the first of the year.

This company has awarded the contract for the erection of a $300,000 hospital building at Denison, Texas, has been awarded by the Hospital Association of this road, to Munn & Co., Dallas, Tex. The building, which will be of brick and reinforced concrete, with slate roof, will provide a capacity of 100 beds. The architects are Roberts & Gresenbeck of Dallas, Tex.

MISSOURI PACIFIC.—This company is rebuilding a section of its line extending from Poplar Bluff, Mo., east to Kinzar, a distance of about 2½ miles. This project involves raising the single track line between these two points on an average of 6 ft., and calls for the construction of 150 ft. of new pile trestle and the raising of 1,430 ft. of existing pile trestle to an average height of 6 ft. The work is made necessary in order to place the track of the Missouri Pacific above the levee now being constructed by the Inter-River district of Butler County, Mo. This company is also rebuilding its line from Fisk, Mo., west, to Ives, a distance of about 2¼ miles. The work calls for the construction of about 3,000 ft. of new pile trestle, and for raising the grade of the line on an average of 10 ft. for the entire distance. To facilitate construction and to avoid interference with traffic on the existing line, the company is constructing a new line about 30 ft. south of the existing track. The project also involves the reconstruction of the company's station facilities at Fisk, and the construction of a water station at Ives. The existing draw span across the St. Francis river is being replaced by two 50-ft. deck plate girders and one 91-ft. 6-in. through plate girder, having a 28-ft. pile trestle approach on each end, requiring 1,100 cu. yd. of concrete and 320,000 lb. of structural steel. The List & Weatherly Construction Company, Kansas City, Mo., is building the new bridge, and company forces are handling the rest of the work. The total cost of the entire project will be $403,000.

NEW INDUSTRIES COMPANY.—This company, fostered by the Chamber of Commerce of Youngstown, Ohio, contemplates the reconstruction of a branch line of the Erie, between Youngstown and Austintown, Ohio. An arrangement has been made by which the company will undertake the actual construction of line and will be repaid by the Erie.

NEW YORK CENTRAL.—At the Port Morris power station of this company in New York City, a 20,000-k.w. turbine and a 35,000-sq. ft. surface condenser will be installed. The General Electric Company has the contract for the installation of the turbine and the Worthington Works, New York City, will supply and install the surface condenser. The estimated cost of this work is approximately $1,000,000. This company has awarded a contract to the General Electric Company for the installation of a 2,000-k.w. rotary converter and three 750-k.w. transformers at its Irvington, N. Y., sub-station. The improvement will cost approximately $100,000.

PACIFIC FRUIT EXCHANGE COMPANY.—This company has begun construction of an ice house and storage warehouse at Ogden, Utah, to form part of the $1,000,000 improvement project contemplated by this company and the Union Depot company of Ogden, which was noted in the *Railway Age* of September 24 (page 549).

SOUTHERN.—This company is contemplating the erection of a passenger and freight station at Russellville, Ala. A passenger station at Jasper, Ala., to cost approximately $75,000 is also being considered. The proposed improvements are both on the line of the Northern Alabama.

ST. LOUIS & SAN FRANCISCO.—This company is accepting bids for the construction of a freight house at Ada, Okla., to cost approximately $50,000.

ST. LOUIS-SAN FRANCISCO.—This company is constructing second track from Olathe, Kan., to Spring Hill, a distance of 7 miles. The company is also building a line from Eureka, Mo., to Pacific, 7 miles in length; a line from Lebanon, Mo., to Sleeper, 7 miles in length; and a section of road from Globe, Mo., to Monett, a distance of 4 miles. The Walsh Construction Company, Davenport, Ia., the List & Gifford Construction Company, Kansas City, Mo., and the Scott & White Company, St. Louis, Mo., are the respective contractors for these projects, which involve a total expenditure of $1,000,000.

Railway Financial News

BALTIMORE & OHIO.—This company has applied to the Interstate Commerce Commission for authority to participate in the National Railway Service Corporation's first equipment trust by the acquisition of equipment at a cost of approximately $14,000,000 thereunder. The company asks authority to issue conditional sale purchase notes to the amount of $13,000,000 and to endorse or guarantee the notes of the corporation to be given by it to the government for the amount of a loan by the government to the railroad of $5,200,000, for which the company has applied. The railroad also asks authority to pledge as additional security for the government loan $3,250,000 of its refunding and general mortgage bonds. It will pay $1,000,000 cash on account of the equipment, which is to include 1,000 box cars at $2,629 each, 1,200 hopper cars at $1,919, 500 refrigerator cars at $4,095 and 1,000 hopper cars at $2,800; also 50 Mikado locomotives at $84,000.

CENTRAL NEW ENGLAND.—The Interstate Commerce Commission on October 19 approved a loan of $300,000 to this company for the purpose of aiding the company to provide itself with additions and betterments to way and structures at an estimated total cost of $500,000. The company itself is required to finance $200,000 to meet the loan of the government.

CHICAGO & EASTERN ILLINOIS.—The sale of this road has been postponed to December 7 and the annual meeting of the company to November 24.

CHICAGO, BURLINGTON & QUINCY. W. W. Baldwin, vice-president, has been elected a director to succeed Samuel C. Scotten, deceased. President F. H. Rawson, of the Union Trust Company, a director, has been elected a member of the executive committee.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—The Interstate Commerce Commission on October 19 approved the making of a loan of $200,000 to this company to enable the carrier to construct a modern steel car repair shop at LaFayette, Ind.

ELGIN, JOLIET & EASTERN. This company has applied to the Interstate Commerce Commission for authority to issue $1,800,000 of equipment trust bonds dated April 1 and payable in 15 annual instalments with 6 per cent interest, to reimburse the director general of railroads for equipment allotted to the company during federal control. The bonds have been negotiated with the United States Trust Company of New York.

KANSAS CITY, MEXICO & ORIENT.—The Interstate Commerce Commission has authorized the receiver to issue a receiver's certificate to the amount of $2,500,000 for one year at 6 per cent to be pledged with the Secretary of the Treasury as security for a loan of $2,500,000 from the United States.

MOUNT TAMALPAIS & MUIR WOODS.—This company has applied to the Railroad Commission of California for authority to declare a stock dividend of 1,590 shares. The company proposes to distribute this dividend to its stockholders at the rate of one share to each two shares now held.

NATIONAL RAILWAY SERVICE CORPORATION. This corporation on October 19 announced an issue of $60,000,000 of its trust certificates for the purchase of equipment to be supplied to the railroads. This corporation was recently organized by the National Association of Owners of Railroad Securities. Its plan of operation was described in the *Railway Age* of August 6, page 241.

The certificates now to be issued are in two series, not to exceed $30,000,000 each, maturing in 15 years. Seven railroads or systems are thus far included in the two series, which provide two distinct methods under which the roads secure equipment. This announcement was accompanied by a statement by S. Davies Warfield, president of the corporation, reading in part as follows:

"The certificates of the service corporation of each series are divided into prior lien and deferred lien certificates. The prior lien certificates are prior in lien, bear interest at the rate of 7 per cent and will be taken by life insurance companies and investment institutions to the extent of 60 per cent of the present issue of each series. Deferred lien certificates to the extent of 40 per cent, bearing interest at 6 per cent, will be issued to secure the government loans to the Service Corporation as the terms to each carrier are approved by the Interstate Commerce Commission. The deferred lien certificates are deferred both as to principal and interest to the prior lien certificates in the hands of investors. A contingent fund and a sinking fund are provided under the trust agreements, which, with the carrier contracts are to be administered by the Service Corporation and the corporate trustees. As additional security to the Service Corporation's certificates, each carrier deposits with the corporate trustee its notes for the purchase or rental of the equipment."

Mr. Warfield stated that carriers other than those provided for in the series are in negotiation with the corporation for equipment. Twenty railroads, he said, have applied for equipment, at an aggregate cost, if supplied, of $125,000,000. The carriers expected to be included in one or the other of the present series are: Baltimore & Ohio; Chicago, Rock Island & Pacific; Bangor & Aroostook; Minneapolis & St. Louis; Wheeling & Lake Erie; Gulf Coast Lines (Tentative); Cincinnati, Indianapolis & Western (Tentative). Their equipment comprises locomotives and freight cars of various classes, the cost approximating $40,000,000.

SANTA FE NORTHWESTERN.—This company was incorporated under the laws of New Mexico on August 16, with an authorized capital stock of $1,000,000. The incorporators are Sidney M. Weil, Ivan Grunsfeld, Guy L. Rogers, J. E. Cox, and Lloyd Sturges, all of Albuquerque, N. M.

TABOR & NORTHERN RAILWAY.—This company, which proposes to take over the property of the Tabor & Northern Railroad, has applied to the Interstate Commerce Commission for authority to issue $45,000 of stock for the purchase of the road and repairing its track; also for the purchase of a locomotive and a passenger coach.

UNION TERMINAL COMPANY OF DALLAS, TEX. The Interstate Commerce Commission has granted authority to this company for the execution of contracts extending the maturity dates of $550,000 of 5 per cent unsecured notes from October 10, 1920, to October 10, 1921, with interest at 6 per cent.

VIRGINIA BLUE RIDGE. This company has applied to the Interstate Commerce Commission for authority to issue a number of short term notes aggregating $97,500, part of which are to renew existing notes about to fall due and some of which had already been issued without authority, through a misunderstanding of the requirements of the law.

WISCONSIN & NORTHERN.—This company has applied to the Interstate Commerce Commission for authority to issue and sell $49,400 of its first mortgage, 6 per cent gold bonds maturing January 16, 1924, which remain unsold of an issue of $1,600,000, dated January 16, 1919. The company desires to sell the bonds at a price not less than 75 per cent of par.

WELDING SOCIETY DECIDES TO FORM NEW YORK SECTION.—The American Welding Society called a special meeting of its New York members on October 14, at the Engineering Societies building, for the purpose of forming a Metropolitan section of the society. About forty members were present at the meeting, which was presided over by Comfort A. Adams, past president of the society. Temporary officers were chosen and a nominating committee was appointed for the purpose of choosing permanent officers for the local section at its first regular meeting, to be held on October 25, at four P. M., in the same building. Sections of the society have already been formed in Philadelphia, Chicago, Cleveland and Pittsburgh. The New York section will begin its career with 125 members who have been transferred from the parent association to the local section.

Railway Officers

Executive

L. C. Gilman, president of the Spokane, Portland & Seattle, with headquarters at Portland, Ore., has been elected vice-president of the Great Northern, with headquarters at Seattle, Wash., effective November 1.

Financial, Legal and Accounting

Alfred Evens, whose appointment as general attorney of the Chicago, Indianapolis & Louisville, with headquarters at Chicago, was announced in the *Railway Age* of October 1 (page 593), was born at Greencastle, Ind., on January 28, 1881. He graduated from De Pauw University in 1902, took post-graduate courses at the University of Chicago in 1904 and 1905, and received a degree from the Indiana University Law School in 1907. At the time of his recent appointment, Mr. Evens was local attorney for the Monon at Lafayette, Ind., a position he had held since 1915. In addition to this duty, he was legal representative of a number of Indiana bank corporations, and was engaged in private law practice.

Operating

John F. Collins has been appointed superintendent of marine department of the Erie, with headquarters at New York City, effective October 1.

W. R. Young has been appointed superintendent of telegraph and signals, of the Grand Trunk, with headquarters at Chicago, succeeding N. E. Baker, who has resigned, effective October 11.

G. H. Jacobus, superintendent on the Northern Pacific at Glendive, Mont., has been appointed superintendent of the Montana division, with headquarters at Livingston, Mont., succeeding T. H. Lantry, transferred, effective October 15.

William J. English, superintendent on the Erie at Jersey City, has been appointed superintendent of the Delaware and Jefferson divisions, with headquarters at Susquehanna, Pa., succeeding Arthur B. Shafer, resigned, on account of ill health, effective October 1.

James Shannon, trainmaster on the Northern Pacific at Spokane, Wash., has been appointed superintendent of the Pasco division at Pasco, Wash., succeeding W. C. Sloan, transferred. **T. H. Lantry** has been appointed superintendent of the Seattle division, with headquarters at Seattle, Wash. These changes are effective October 15.

G. W. Wilde, chief despatcher on the Philadelphia & Reading, at Philadelphia, has been appointed passenger trainmaster, with headquarters at Philadelphia. **B. H. Baker,** assistant chief despatcher at Philadelphia, succeeds Mr. Wilde as chief despatcher and **H. B. Wilt** succeeds Mr. Baker as assistant chief despatcher. These changes are effective October 20.

R. E. Simpson, general superintendent of the Southern at Greensboro, N. C., has been appointed general manager, Lines East, with headquarters at Charlotte, N. C., succeeding W. N. Foreacre, deceased. **A. D. Shelton,** superintendent at Greensboro, has been appointed general superintendent, Northern district, at Danville, Va. **R. L. Avery,** superintendent at Norfolk, Va., has been made superintendent of the Danville division, with headquarters at Greensboro, N. C. **D. B. Nolan,** trainmaster at Greensboro, has been appointed superintendent of the Norfolk division, with headquarters at Norfolk, Va. All these changes were made effective October 16.

Traffic

C. E. Stone, passenger traffic manager of the Great Northern, with headquarters at St. Paul, Minn., will retire from service as soon as his successor is appointed.

L. W. Bade, city passenger agent of the Wabash, with headquarters at St. Louis, Mo., has been transferred to Chicago, with jurisdiction over the Lines East of the Mississippi River. **F. D. Hammer** has been appointed assistant general passenger agent, with jurisdiction over the Lines West of the Mississippi River, with headquarters at St. Louis, Mo., succeeding John Maloney, effective October 15.

Engineering, Maintenance of Way and Signaling

H. Wilson, engineer maintenance of way of the eastern division of the Chicago Great Western, with headquarters at Chicago, has resigned, to become trainmaster on the Denver & Rio Grande, with headquarters at Denver, Colo., effective October 15.

E. W. Engelbright, engineer for the Union Pacific in New York City, with offices at 120 Broadway, and his entire staff, will be transferred, October 22, to Omaha, Neb., where this office will be consolidated with that of E. E. Adams, assistant to the president.

George G. Thomas, junior office engineer of the Atlantic Coast Line, has been appointed engineer of bridges, with headquarters at Wilmington, N. C., succeeding M. E. Nelson, resigned. **D. B. Packard** has been appointed office engineer, with headquarters at Wilmington, N. C., succeeding George G. Thomas, effective October 16.

Purchasing and Stores

E. V. Reinhold, assistant to the manager of purchases and stores of the New York Central Lines, with headquarters at Buffalo, N. Y., has been appointed assistant purchasing agent, in charge of fuel, of the New York Central Railroad, with headquarters at New York, effective October 15.

U. K. Hall, general storekeeper of the Union Pacific, with headquarters at Omaha, Neb., has been appointed general supervisor of stores of the Union Pacific System, with the same headquarters, effective September 28. This is a newly created position having to do with the development of policies, the organization and plans to be followed, in a general way, by the stores organization of the Union Pacific System. The actual details of the plans to be followed out will be executed by the general storekeepers of the units comprising the system so that the general supervisor of stores will act only in an executive and directing capacity, reporting directly to the assistant to the president. Mr. Hall's entire career has been with the lines comprising the Union Pacific System, with the exception of eighteen months spent in Washington as associate manager of the Stores Section of the Railroad Administration. Mr. Hall was born in 1878 at Portland, Oregon, and entered the employ of the Union Pacific System in 1897 as an office boy in the office of the purchasing agent. In 1899 he was transferred to the stores on construction work and in 1900 to the accounting department, occupying various positions on roadway, engineering and stores accounts. In 1904 he returned to the stores department and in 1912 was promoted to the position of general storekeeper of the Oregon-Washington Railroad and Navigation Company at Portland. In 1916 he was transferred to Omaha as general storekeeper of the Union Pacific. He will be succeeded in this position by O. Nelson, traveling storekeeper, with headquarters at Omaha, whose appointment took effect October 1.

Obituary

Richard Lamb, at one time chief engineer of the Wilmington & Newburn, now a part of the Atlantic Coast Line, died at his home in Brooklyn, N. Y., on October 18. Mr. Lamb was a well known consulting engineer. Born in Norfolk, Va., he graduated from Brown University and commenced his engineering career with the surveying of the Albemarle and Chesapeake canal. He planned the drainage of the Dismal Swamp and had charge of building the largest coal dock in the world. A process for refining copper ore by electricity was one of his inventions. Mr. Lamb was a member of the American Society of Civil Engineers, the American Institute of Electrical Engineers and the New York Electrical Society.